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NATIONAL PARK SERVICE
RESEARCH/RESOURCES MANAGEMENT REPORT SER-76

Environmental Monitoring and Baseline Data Management Strategies and the Focus of Future Research in Great Smoky Mountains National Park

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ENVIRONMENTAL MONITORING AND BASELINE DATA MANAGEMENT STRATEGIES AND THE FOCUS OF FUTURE RESEARCH IN GREAT SMOKY MOUNTAINS NATIONAL PARK

by John D. Peine, Charlotte Pyle and Peter S. White

NATIONAL PARK SERVICE - Southeast Region

Research/Resources Management Report SER-76

Uplands Field Research Laboratory
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INTRODUCTION

This report evolved from an attempt to develop coherent links between the environmental monitoring activities of years past, present monitoring activities, and plans for future efforts in Great Smoky Mountains National Park (GRSM). The major purpose of this report is to provide managers and researchers with summary information on current and past monitoring and research data collected in GRSM as well as to identify some areas of concern in which the available information is inadequate.

The U.S. Man and the Biosphere program produced a bibliography and a history of scientific studies done in GRSM (U.S. MAB Reports Nos. 4 and 5). Published in 1982, they consist primarily of journal articles, theses, and dissertations. By contrast, much of the research cited herein is unpublished. Additionally, research contained in this document is more recent. Finally, many of these data sets have not been fully analyzed. For these reasons, this publication and the MAB publications should be seen as complementary efforts.

Section I of this report lists goals and objectives of the program which have been set up to develop a comprehensive environmental baseline data set and an environmental monitoring program for the park. Specific actions to be taken within the next 2 to 3 years are listed under each of these sets of goals and objectives. The environmental monitoring program for the park will not be completely developed by then, but it is hoped the plan presented in this document will form a nucleus around which an effective and efficient monitoring program, relevant to the needs of NPS management, can evolve. An evironmental monitoring program must have both continuity and flexibility, since there is a need for long-term measurements of environmental parameters which can easily be compromised by constraints of funding and manpower. Keeping this in mind, we have developed an environmental program which is built upon the data from past research and monitoring efforts, including work done by NPS researchers, non-NPS researchers, and interagency programs such as the Look Rock Air Quality Monitoring Station and the National Atmospheric Deposition Program.

Section II begins with an overview of GRSM data sets, which are presented in condensed form. Adequate information is provided for each data set so that any manager or researcher may gain access to the data sets, which in most cases are on file at GRSM. The data set overviews are arranged in such a way that workers in various fields can find data sets of interest to them quickly and easily. For instance, a botanist interested in endangered plant species in the park would simply look in section II, part A, under the heading "Biological Resources," and turn to the section on terrestrial flora.

Part B of section II consists of a series of tables which provide general information about research and monitoring activities for each watershed in the park. The section begins with two maps: one map delineates the various watersheds, each of which is identified by the name of the major stream draining the watershed and an assigned number which is used throughout the rest of the section; the other map shows the positions and names of each of the major streams and rivers in the park. These maps are followed by tables which outline monitoring and research activities in the park by watershed.

Section III is a list of research ideas developed by the science and resources management staffs at GRSM. No priority ranking was attempted in developing these lists, and the lists are far from complete. They are intended to be suggestions for further research but are not intended to place limits on research in the park. There are certainly innumerable research topics in both basic and applied fields that have not been covered.

We would like to invite researchers from other government agencies and academia to come to GRSM and help the NPS solve its many natural resources management problems as well as to continue the quest for basic knowledge of natural ecosystem structure and function. We hope this document will help provide the impetus to to develop such cooperative interaction.

I. STRATEGY FOR ACHIEVING EFFECTIVE ENVIRONMENTAL BASELINE DATA AND MONITORING AT GREAT SMOKY MOUNTAINS NATIONAL PARK

As an International Biosphere Reserve, GRSM has an obligation to maintain an efficient and effective environmental monitoring program. There is no "ultimate" environmental baseline data collection and monitoring strategy since management and scientific perspectives rapidly evolve. The underlying philosophy directing this strategy involves taking action now to ensure that today's scientific efforts contribute to the building of a cohesive data base and environmental monitoring program. This strategy reflects actions incorporated in the GRSM Resources Management Plan. The action statements refer to present and near future (1- to 2-year) programs.

Goal A. Adequately describe and monitor change in the ecosystems of GRSM.

Objective A.1 Describe the biological, geophysical, and anthropological environment as prescribed as Level I in the publication entitled "Long-Term Ecological Monitoring in Biosphere Reserves," a U.S. Man and the Biosphere Program, August 1979.

Action A.1.1. Use remote sensing data to describe vegetation and soils.

Action A.1.2. Continue the GRSM vegetation monitoring program. Permanent .1-ha monitoring plots have been established for 300 sites in the western Tennessee side of GRSM. New plots will be established in the future on the North Carolina and Tennessee sides for more even geographic distribution. New plots are planned for the spruce-fir zone of the park. These are all-purpose monitoring plots, in part, established to develop site-specific data for vegetation mapping. They have been used to monitor the following ecosystem properties:

Tree mortality
Tree growth
Tree recruitment
Succession after human or natural disturbance
Changes in herb or shrub cover
Percent exposed soil

For the following resource problems:

Wild hog rooting 3/yr,1978-1979
Campsite impacts (trampling and firewood gathering)
White-tailed deer and cattle browsing, Cades Cove
Succession and mortality patterns after fire 1/yr,1978-1980
Succession after chestnut blight

These plots are available to study long-term stand dynamics and such long-range problems as air quality impacts, with a reinventory schedule of 5 to 20 years. These plots have been used to recruit further research by university scientists.

Vegetation monitoring is recorded on FORTRAN format data sheets, keypunched, analyzed, and stored on magnetic tape. Tapes are stored at the University of Tennessee Computer Center and (2 duplicate sets) in the park. Stored data includes:

Raw data
Data summarized by plot
Ordination and classification data for project sets
Programs used in analysis

The data is divided by stratum:

Trees and saplings
Shrubs
Herbaceous stratum

Efforts will be made to coordinate this work with ongoing work in other parks.

Action A.1.3 Continue the bibliography series on GRSM on the subjects of bryophytes, lichens, geology, soils, and macroinvertebrates. Build a retrievable computerized data base from the bibliography series, using hardware and expertise through the University of Tennessee library system.

Action A.1.4 Map disturbance history of fire, logging, settlement, and agriculture.

Action A.1.5 Rare plant mapping

Rare Plant Populations - Existing

Starting in 1980, all rare and endangered vascular plant species were evaluated for population monitoring. All locations are being mapped on USGS 7.5-minute quadrangle sheets; top priority plants are mapped in detail on a finer scale. Maps of all known individuals in populations are created for the top priority species that occur in very small populations; for priority species found in larger local populations, random areas are sampled within the population as a whole. For 1981 and 1982, this work was carried out with funding and volunteer effort by Earthwatch through the Center for Field Research. Unless acute threats are suspected (see below), reinventory of populations will be done on a 5 to 20 year rotation.

Species populations mapped in detail in 1982:
Betula cordifolia
Cacalia rugelia
Calamagrostis cainii
Campanula aparinoides
Cirsium carolinianum
Cladrastis kentukea

Geum radiatum
Glyceria nubigena
Hydrastis canadensis
Platanthera peramoena
Prunus virginia
Rhododendron bakeri
Woodwardia virginica

The above list will be expanded as new species or populations are verified in the park and as new threats to rare taxa are evaluated. Acute threats are suspected for several of these species, and monitoring should proceed annually until data permit reevaluation of degree of threat. These species include:

Species	Suspected Threat
Campanula aparinoides	Wild hog rooting
Geum radiatum	Trampling, erosion
Glyceria nubigena	Grassy balds succession
Hydrastis canadensis	Poaching
Platanthera peromoena	Succession, wild hog rooting
Rhododendron bakeri	Grassy balds succession
Woodwardia virginica	Trampling, wild hog rooting

In addition, Helianthemum bicknellii will be experimentally reintroduced to Gregory Bald in 1984; this population should be subsequently monitored.

Characteristics recorded for rare plant populations:

Density
Cover
Individual plant size
Size or age structure
Flowering or fruiting
Threats

Action A.1.6. Vegetative response to grassy bald restoration practices will be monitored in order to determine most effective control methods and for the purposes of developing a maintenance schedule. Monitoring must also focus in on potential or real management impacts on rare and unique plant species which were the primary impetus for development of the balds management program and to ensure compliance with the Endangered Species Act of 1973 as amended. All herbicide quantities and usage will be closely monitored.

Objective A.2. Establish a baseline data management program to allow for future trend analysis as the opportunity occurs.

Action A.2.1. Fully document and computerize data from permanent vegetation plots. Relocate plots and retrieve data for the spruce-fir zone.

Action A.2.2. Publish a summary of existing data sets, monitoring strategy, and research priorities as a vehicle to recruit scientific interest in trends related research (this document).

Action A.2.3 Compile a data format for recording research in all streams in the park. Utilized as much as possible the River Reach program used by the State of Tennessee.

Action A.2.4 For each Uplands Field Research Laboratory (UPFI) sponsored field research project, maintain complete documentation of method and data format, a data set, and copies of publications.

Action A.2.5 Develop a computerized cartographic data base for soils, vegetation, geology, disturbance history, rivers and streams, topographic features, trails, roads and buildings, and watersheds.

Action A.2.6 Continue to follow the current procedures to evaluate campsites and trails utilized by the Divisions of Maintenance and Ranger activities as it relates to their various areas of responsibilities.

Action A.2.7 Development of an air quality data bank for GRSM summarizing monitoring data on criteria pollutants of the Clean Air Act, ascertained adverse impacts, nearby point source pollutant loadings, and permit applications.

Objective A.3 Describe threatened ecosystems as prescribed by Level II of the MAB publication cited in Objective A.1.

Action A.3.1 Encourage researchers to focus their efforts on the spruce-fir zone of GRSM, which is now threatened by the impact of balsam woolly aphid infestation and air pollution.

Action A.3.2 Establish a major research project for ecosystem description and modeling in the spruce-fir zone.

Action A.3.3 Establish monitoring plots in the oak forest ecosystem, and possibly hemlock-dominant ecosystem, as a benchmark at preinvasion so as to later measure impact of the gypsy moth.

Objective A.4 Monitor rare and endangered species populations.

Action A.4.1 Remeasure permanent plots in rare vegetation populations every five years.

Action A.4.2 Continue to census Indiana Bat populations within Blowhole and Bull caves every other year by qualified individuals. If the population should fall below a 25 percent aggregate average of past years' counts, all entry will be postponed until the cause of the decline is determined.

Action A.4.3 Develop and install appropriate signs at cave entrances that will explain the cave's significance and state current regulations relating to illegal entry and vandalism.

Action A.4.3 Develop and install appropriate signs at all cave entrances that will explain the cave's significance and state current regulations relating to illegal entry and vandalism.

Action A.4.4 Continue to monitor known active sitesof the red-cockaded woodpecker to gather information about the status of the species at various times of the year and also to access the habitat for natural or unnatural changes that may affect the species and its wellbeing within the park.

Objective A.5 Monitor selected indicators for environmental trends.

Action A.5.1 Maintain the Convertible Data Collection Platforms and Solar Radiation Stations at Clingmans Dome and Cove Mountain. The following data are recorded on an hourly basis and transmitted every 3 hours to the Geostationary Operational Environmental Satellite maintained by NASA:

Air temperature
Relative humidity
Precipitation
Wind speed
Wind direction
Barometric pressure

Pyranographs continously record solar radiation levels.

Action A.5.2 Maintain eight meteorological stations for the following parameters:

	Temp.		RH			Cloud	Wind		Fine fuel
Station	Hi	Lo	Hi	Lo	Rainfall	Cover	Speed	Dir.	moisture
Headquarters	x	x	x	x	x	x	x	x	x
Cades Cove	x	x	x	x	x	x	x	x	x
Oconaluftee*	x	x	x	x	x				
Newfound Gap	x	x			x				
Kephart					x				
Cataloochee					x				
Chimneys					x				
Cosby					x				

*All parameters measured during fire season (Feb. 15-Dec. 1)

Action A.5.3 Monitor cloud moisture deposition along the Clingmans Dome road.

Action A.5.4 Monitor sport fisheries population. This program will consist of two major parts, a creel census and a stream survey, that will be conducted simultaneously on the same stream. Six of the heaviest fished streams in the park have been selected for survey. These streams are Abrams Creek, Oconaluftee River, Deep Creek, Hazel Creek, Little River, and the Middle Prong of the Little Pigeon River. Two of these streams will be sampled each year on a 3-year rotation so that all are sampled once every 3 years.

Creel Census. A creel census will be conducted weekly during the fishing season on each of the two streams sampled each year. Each census will last for 8 hours, with the time, day, and location on the stream randomly selected by computer. This census will provide information on catch per unit (number and size of fish taken), fishing pressure, and a variety of socioeconomic variables.

Stream Survey. A survey of the fish populations present in each stream will be sampled on a number of permanently marked 200-meter sections. Each secion will be electroshocked to determine the number and type of fish present, age structure, sex ratio, growth rates, and food habits. In addition, benthic insects, water quality, and stream characteristics will be sampled to monitor the overall health of the stream and illustrate trends. Each stream will be sampled in the fall of every third year, with two streams sampled each year.

Action A.5.5 Initiate a stream ecology monitoring program concerning stream chemistry and indicator species for heavy metals, pesticides, and acid rain. This project will be developed in close relationship with the park geology, disturbance, history, and vegetative types.

Action A.5.6 Continue to monitor all potable park waters and waste water systems by methods prescribed within the Safe Drinking Water Act and the Clean Water Act, and to monitor streams under special circumstances when construction or special activities might cause pollution.

Action A.5.7 Review methods of monitoring hard mast production and determine if digitized topographic, vegetation, soils, and topographic data can be used to estimate more productive mast sites during years of stress due to weather or selected pathogens.

Action A.5.8 Continue to monitor bear population densities and distributions as well as to run the annual hard mast survey as outlined within the Bear Management Plan. Continue to maintain all bear records within the Resources Management office. Continue to share the data obtained from the various surveys with other State and Federal agencies involved with wildlife and bear management programs.

Action 5.5.9 Evaluate the present method of estimating the bear population distribution and density as to its accuracy and needed frequency of measurement.

Action A.5.10 Continue distribution and density surveys, mortality zones, and documentation, and disease surveys of white-tailed deer in both the historical zones and the remainder of the park. Continue to document significant deer related incidents and observations for potential management implications.

Goal B. Identify and monitor threats to the GRSM physical and chemical environment.

Objective B.1 Monitor airborne pollutant loading and identify paths, sinks, and effects on biota.

Action B.1.1 Maintain the National Atmospheric Deposition Program (NADP) site at Elkmont. A sample of wetfall deposition is collected each Tuesday and sent to the NADP Central Analytical Laboratory in Champaign, Illinois, where the following wetfall parameters are measured:

- *pH
- *Conductance
- Calcium
- Magnesium
- Potassium
- Sodium
- Ammonia
- Nitrate
- Chloride
- Sulfate
- Phosphate
- Hydrogen ion concentration
- Total cations
- Total anions
- Cation-anion ratio

*Measured as well by UPFI staff

Dryfall samples are collected (buckets changed every 8 weeks) and are being analyzed by NADP.

Action B.1.2 ICP (inductively coupled plasma emission spectrophotometer) analysis of wetfall samples for heavy metals from collectors located at Elkmont, Cataloochee, Clingmans Dome, Cosby, Fontana Dam, and Smokemont have been completed. No significant variation was observed between sites, but more precise measurements are needed, using an atomic sbsorption spectrophotometer, to obtain values in the parts per billion range.

Action B.1.3 Monitor cloud moisture deposition (fog interception) chemistry at Clingmans Dome. Monitoring will continue after a research project is completed by Oak Ridge National Laboratory scientists in FY88.

Action B.1.4 Monitor air quality on the Tennessee side of the park: a joint effort by UPFI, GRSM; the State of Tennessee Air Quality Control Division; and the Tennessee Valley Authority Environmental Services Branch. The following parameters will be measured at the Look Rock air quality monitoring station (elevation 2600 ft):

Sulfur dioxide	Continuous
NO/NO_x	Continuous
Ozone	Continuous
*Hydrocarbons (C_1-C_{10})	Periodically
*Fine aerosol mass	72-Hour
*Fine aerosol composition	72-Hour
Scattering coefficient	Continuous
Wind speed and direction	Continuous
Temperature	Continuous
Dew point	Continuous
Solar intensity	Continuous
Rain intensity	Continuous

*No samples being taken presently

The Elkmont air quality trailer will be moved to Cove Mountains (elevation 4600 ft) to house an ozone monitor.

Action B.1.5 Monitor visibility via an automated teleradiometer from Look Rock aimed at Gregory Bald along the Great Smoky Mountains ridgeline.

Action B.1.6 Establish an air quality monitoring station on Clingmans Dome (Elevation 6600 ft) to measure ozone.

Action B.1.7 Establish permanent plots for monitoring the following:

Ozone burn in white and Virginia pine
Air quality impacts in lichens

Action B.1.8 Complete a sulfur baseline/accumulation survey using lichens as bioindicators.

Action B.1.9 Survey, in the laboratory and field, selected rare plants for air pollution sensitivity.

Objective B.2 Identify and monitor exotic species and their effects.

Action B.2.1 Continue to document all exotic species and their locations as well as the status of the species and treatments. When species are found to cause significant real or potential impact upon the park's natural and/or cultural resources, those species should be considered one of the "significant" species and be elevated to greater attention.

Similar attention will be given to pest species, both native and non-native. All pesticide use logs will be maintained with the office of Resources Management. Testing of various soils to determine pesticide loading after treatments and to help determine when native plant species can be introduced for site restoration will be incorporated as funds and time permit.

Action B.2.2 Implement the newly devised method of estimating distribution of hog rooting and monitoring the population with specific biological data from captured animals.

Action B.2.4 Monitoring balsam woolly aphid life cycles to time spraying applications to coincide with crawler stages will be continued. Post-spraying evaulations on effectiveness as well as vegetation impact will be monitored and documented. New or changes in infestations, changes in vegetative compositions, and other notable parameters (as recognized) will be conducted in a qualitative, if not quantative, manner. Also, remeasure spruce-fir plots of mid-70s.

Action B.2.5 Monitor hog exclosures. Five fenced plots have been established in heavily and lightly impacted northern hardwood stands. Efforts will be made to coordinate this work with ongoing work in other parks.

Action B.2.6 Continue to overview the citizen volunteer trapping and removal program on the North Carolina side as per agreement.

Action B.2.7 Continue to observe and record hog locations, behavior, and specific impacts and hog/visitor confrontations throughout the park, especially at areas considered to be special protected sites, to provide for long term indices.

Action B.2.8 Record hog impacts on park neighbors. This activity should include the investigation and documentation of all hog impacts to park neighbors relating to agricultural, recreational, and any other factors that can be utilized to illustrate increasing impacts of these exotics within the Great Smoky Mountains area. These records should be submitted to the Division of Resources Management for publication and documentation.

Action B.2.9 Continue to document all information on the significant resources of special protection zones and continue to step up efforts to give greater attention to the units. This will be accomplished by increasing ranger patrols to these sites and creating greater awareness of the importance of these sites within the park.

Action B.2.10 Monitor rainbow and brown trout range expansions in streams and rivers in GRSM and their effects on brook trout and other native species.

Action B.2.11 Sample streams voided in FY84 to establish species composition in stream segments to assess long-term recovery of rainbow trout.

Action B.2.12 Sample streams voided in past years to document success of previous activities, and continue this sampling procedure for five years to assess the recovery potential of the rainbow trout.

II. BASELINE DATA IN GREAT SMOKY MOUNTAINS NATIONAL PARK

II.A. DATA MANAGEMENT AND OVERVIEW

INTRODUCTION

The following half-page summaries of data sets from research and monitoring projects in GRSM are to acquaint the reader with past and present research projects and to stimulate interest in further research. We also hope that researchers will recognize gaps in past and present research and monitoring activities and will seek to fill these gaps wherever possible. Each data set is listed under a project or data base name, file index category, and project number (using an NPS-UPFI filing system code for ease of access at the laboratory), and the period of data collection. A short description of each project is given, as well as lists of parameters measured, equipment/procedures used, and frequency of measurement of each parameter. The principal investigator's name is given for each data set, as well as his/her present location, if known.

Publications resulting from the data are listed in very shortened form, with only enough information being given to locate the publication if needed. This means that titles and full names of authors are usually deleted, except where deemed necessary to locate the publication in question. This was done in order to conserve space. Complete bibliographic references are listed in the more extensive data summary forms on file at UPFI.

Heading number 8, "Opportunities for additional use of these data or proposals for additional hypotheses to be tested," is intended to spur interest on the part of other agencies and university researchers in seeking solutions to natural resource and environmental problems at GRSM. Not all the data sets have ideas listed under this heading, but this doesn't necessarily mean that these data sets have no further use We hope that other researchers may find them useful in some way not immediately noticeable to us. There are a number of unevaluated data sets that have not been included in this list. These are on file at UPFI.

Another key source of information concerning data sets relevant to GRSM is a document entitled, "Great Smoky Mountains Biosphere Reserve: History of Scientific Study," U.S. Man and the Biosphere Program, USMAB Report 5, National Park Service, Southeast Regional Office, Atlanta, Georgia, March 1982. The ensuing chapter greatly expands the citings of available data bases listed on page 148 of the MAB report.

For those interested in more information on specific data sets, contact UPFI for those sets listing a project number, and the principal investigator for those not listing one.

II.A.l.a. Physical Resources - Air and Water Quality

UPFI DATA SETS

(1) Project (or data base) name: Fog Interception Studies

(2) File index category and project number: N3615-11

(3) Period (month/year) of data collection: From: 9/82 To: 3/84

(4) Short description: Measurement of relative amounts of rain vs. fog vs. canopy vs. throughfall at high elevation in GRSM.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rain amount	Heilman rain gauge	Weekly
Fog and rain	Heilman gauge w Grunow Fog interceptor	Weekly
Canopy throughfall	Rain gauges (4)	Weekly

(6) Project principal investigator(s) name/present location:
Douglas Holland, University of Tennessee

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Air Mass Trajectories

(2) File index category and project number: N3615-01

(3) Period (month/year) of data collection: From: 7/1/79 To: 6/30/80

(4) Short description: Using the Hefter Transport Model, air mass trajectories for all precipitation events that occurred in GRSM from 7/1/79 to 6/30/80 have been determined.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Air mass trajectories	Hefter Atmospheric Transport and Diffusion Model	Precipitation events

(6) Project principal investigator(s) name/present location:
Ray Mathews, Jr., Knoxville, TN
Grant Goodge, National Climatic Center, Asheville, NC

(7) Publications resulting from data:
Abstracts of Uplands Field Research Lab. Annual Science Meetings, 1981 & 1982.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

(1) Project (or data base) name: Hydrolab Stations -Camel Hump and Huskey Branch

(2) File index category and project number: N3617-01

(3) Period (month/year) of data collection: From: 8/79 To: 8/82

(4) Short description: Hydrolab stations on Camel Hump Creek and Huskey Branch in GRSM measured the parameters listed below.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
pH	Hydrolab unit	Hourly
Conductivity	"	"
Temperature	"	"
Dissolved oxygen	"	"
Redox potential	"	"

(6) Project principal investigator(s) name/present location:
Ray Mathews, Knoxville, TN

(7) Publications resulting from data:

Burge, Herrmann, and Mathews.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: N/A

UPFI DATA SETS

(1) Project (or data base) name: Solar radiation monitoring

(2) File index category and project number: N36

(3) Period (month/year) of data collection: From: 12/29/80 To: 2/83

(4) Short description: Two pyranographs (located at Elkmont and Clingmans Dome) continuously monitor and record solar radiation levels

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Solar radiation	Pyranograph	Continuous

(6) Project principal investigatpr(s) name/present location:
Doug Holland, University of Tennessee

(7) Publications resulting from data:
None

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: May be useful in fog/cloud moisture interception studies.

UPFI DATA SETS

(1) Project (or data base) name: Hydrolab Stream Stations - Abram's Creek

(2) File index category and project number: N3617-02

(3) Period (month/year) of data collection: From: 6/77 To: 8/79

(4) Short description: Hydrolab stations on Abram's Creek measured streamwater pH, conductivity, temperature, dissolved oxygen and redox potential on an hourly basis.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
pH	Hydrolab unit	Hourly
Conductivity	"	"
Temperature	"	"
Dissolved O_2	"	"
Redox potential	"	"

(6) Project principal investigator(s) name/present location:
Ray Mathews, Knoxville, TN
Gary Larson, NPS Midwest Regional Office, Omaha, NE

(7) Publications resulting from data: Bratton, Mathews, and White. Environ. Manage. 4(5):433-448, 1980.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Stream Stage Heights Monitoring

(2) File index category and project number: N3617-01

(3) Period (month/year) of data collection: From: 1/30/79 To: 8/5/82

(4) Short description: Stage heights were monitored continuously on three streams in GRSM - Camel Hump Creek, Huskey Branch, and Clingmans Creek

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Stage height	Stage height recorder	Continuous

(6) Project principal investigator(s) name/present location:
Ray Mathews, Knoxville, TN.

(7) Publications resulting from data:
N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: National Atmospheric Deposition Program

(2) File index category and project number: N36-05
(3) Period (month/year) of data collection: From: 9/80 To: Present

(4) Short description: Long term atmospheric deposition monitoring site, part of a nationwide network

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
pH	Altex pH meter	Weekly
Conductivity	Altex conductivity bridge	"
Precipitation amount	Rain gauge	"
Ca, Mg, K, Na, NH_4	Analyzed by Central Analytical	"
NO_3, Cl, SO_4, PO_4	Laboratory, Illinois State	
H, anions, cations	Water Survey	

(6) Project principal investigator(s) name/present location:

David Silsbee, UPFI

(7) Publications resulting from data: Numerous publications available from NADP, Illinois Water Survey, 605 E. Springfield, Champaign, Illinois.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Remote Weather Stations

(2) File index category and project number: N36-04
(3) Period (month/year) of data collection: From: 6/77 To: 12/83

(4) Short description: Remote weather stations at Elkmont and Clingmans Dome continuously monitor and record the information listed below.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rainfall amount	Met-One Weather Tower	Hourly
Temperature	interfaced with a LeBarge	"
Relative humidity	transmitter - GOES	"
Barometric pressure	satellite system	"
Wind speed		"
Wind direction		

(6) Project principal investigator(s) name/present location:
Douglas Holland, Univ. of Tennessee

(7) Publications resulting from data: Johnson and Bratton. Biol. Conserv. 13:105-115, 1978. Herrmann, Stoneburner, Larson, and Mathews. Pecora IV, 1978. Mathews Herrmann, and Burge. The ASB Bull. 25(2):35, 1978.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Precipitation Chemistry, Parkwide

(2) File index category and project number: N36-04
(3) Period (month/year) of data collection: From: 6/79 To: 9/82

(4) Short description: Precipitation from five sites chemically analyzed each week: Elkmont, Cosby, Clingmans Dome, Smokemont, Fontana

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
pH	Altex pH meter	Weekly
Conductivity	Altex conductivity bridge	"
Acidity	APHA-Standard methods	"
Sulfates	"	"
Nitrates	"	"
Toxic metals	State of Tennessee, NPS-Colorado State Univ.	"

(6) Project principal investigatpr(s) name/present location:
Ray Mathews, Knoxville, TN.

(7) Publications resulting from data: Mathews, Larson, and Silsbee. Proc. 2nd Conf. Sci. Res. in Natl. Parks, 1979. Mathews and Larson. Proc. 1st Conf. of SETAC, 1980.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Data should be examined to determine spatial and temporal variations in precipitation chemistry..

UPFI DATA SETS

(1) Project (or data base) name: Stream Chemistry

(2) File index category and project number: N3617-01
(3) Period (month/year) of data collection: From: 1/79 To: 8/82

(4) Short description: Grab samples taken biweekly from Camel Hump Creek, Huskey Branch, and Clingmans Creek and analyzed for parameters listed below.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
pH	Altex pH meter	Biweekly
Conductivity	Conductivity bridge	"
Acidity	APHA-Standard methods	"
Alkalinity	"	"
Sulfates	"	"
Nitrates	"	"
Phosphates	"	"
Turbidity	Turbidity meter	"
Toxic metals	State of Tennessee	"

(6) Project principal investigator(s) name/present location:
David Silsbee, UPFI
Ray Mathews, Knoxville, TN

(7) Publications resulting from data:
Silsbee, D. G., and G. L. Larson. 1983. Hydrobiologia 102, 99-111.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: May be applicable to the development of an environmental trends report.

UPFI DATA SETS

(1) Project (or data base) name: Air Quality - Elkmont Station

(2) File index category and project number: N3615-02

(3) Period (month/year) of data collection: From: 3/82 To: 9/83

(4) Short description: The State of Tennessee operated an air quality monitoring station at Elkmont Campground in Great Smoky Mountains National Park.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
SO_2	Recording meter	Hourly
TSP	Recording meter	Every 6 hours
Hydrocarbons		Intermittent

(6) Project principal investigator(s) name/present location:
Larry Killebrew, Tennessee Dept. of Air Pollution Control, Nashville, TN.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Air Quality - Look Rock Station

(2) File index category and project number: N3615-03

(3) Period (month/year) of data collection: From: 8/80 To: Present

(4) Short description: The National Park Service, Tennessee Valley Authority, and State of Tennessee cooperatively operate an air quality monitoring station at Look Rock.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Ozone	Recording meter	Continuous
SO_2	"	"
NO/NOX	"	"
Hydrocarbons	Stainless steel spheres	Periodically
Fine particulates	Fine particulate sampler	72-hour
Visibility	Teleradiometer, nephelometer	Continuous
Meteorological parameters	Anemometer, hygrometer, etc.	Continuous
Total suspended particulates	High-vol sampler	24-hour period every 6 days

(6) Project principal investigator(s) name/present location:
David Silsbee, UPFI
Larry Killebrew, Tennessee Dept. Air Pollution Control, Nashville, TN

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Investigation of vegetation damage during high ozone level events.

UFRL DATA SETS

(1) Project (or data base) name: Heavy metals in storm water runoff

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 12/84 To: 3/85

(4) Short description: Water samples from 10 sites in the park were taken during a storm event and analyzed for heavy metals. Sites included parking lots, streams receiving park lot or road runoff and controls.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Heavy metals	Standard procedures	Once

(6) Project principal investigator(s) name/present location:
Mark Alston, UPFI; Dana Heinbecher, Fort Collins Water Laboratory

(7) Publications resulting from data:

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

II. A.1.b. Physical Other Than Air and Water Quality

UPFI DATA SETS

(1) Project (or data base) name: Weather Records

(2) File index category and project number: N3615

(3) Period (month/year) of data collection: From: 1931 To: Present

(4) Short description: Various parameters measured at various places in GRSM; temperature and precip. records most constant, followed by RH, general state of the weather, and wind direction.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Precipitation	Rain gauges	Daily
Max/min temperature	Max/min thermometer	"
Relative humidity	Various methods/equipment	"
Wind direction	Wind vane	"
Wind velocity	Anemometer	"
Cloud cover	Type, amount	"

(6) Project principal investigator(s) name/present location:
GRSM Resources Management and UPFI

(7) Publications resulting from data: Shanks, R. E. 1954. Ecology 35:354-361. Wiser, E. H. 1972. WRRI, Rep. 66. Numerous government publications.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: (1) What are normal vs. extreme values; (2) what is an "average" year; (3) variations from "average" and effects; (4) patterns of drought and high rainfall; (5) general seasonal patterns.

UPFI DATA SETS

(1) Project (or data base) name: Fire Reports

(2) File index category and project number: Y14

(3) Period (month/year) of data collection: From: 1931 To: Present

(4) Short description: Wildfire reports for GRSM and adjoining properties where suppression responsibility is shared. Report formats varied.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Location	Observation	Per incident
Duration and expenditures (men & equipment	"	
Severity	"	
Fire behavior	"	
Weather		

(6) Project principal investigatpr(s) name/present location:
GRSM Resources Management Division

(7) Publications resulting from data:
Harmon, M. E. 1980. Unpublished Master's thesis, University of Tennesee, Knoxville, TN. 196 pp. Harmon, M. E. 1981. R/RM Rep. No. 46. 39 p.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Annual Campsite Survey

(2) File index category and project number: N1623

(3) Period (month/year) of data collection: From: ? To: Present

(4) Short description: Yearly survey of all backcountry sites/shelters involving Standard survey form, color photos, and scale Yearly survey

1

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Bare soil	Plane table and range finder	Annually
Bare soil	Color photos	"
Damage to vegetation	Subjective	"
Horse/human waste	Subjective	"

(6) Project principal investigator(s) name/present location:
R. Wightman, GRSM Resources Management Division

(7) Publications resulting from data:
N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: (1) Determine relative impact of horses vs. foot traffic: (2) Long term changes resulting from campsite use; (3) Visitor preferences for campsites.

UPFI DATA SETS

(1) Project (or data base) name: Trail and Campsite Erosion Survey - GRSM

(2) File index category and project number: N54

(3) Period (month/year) of data collection: From: 10/75 To: 2/77

(4) Short description: Survey of trail and campsite erosion and impact

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Forest type	Observation	Once
Slope	Clinometer	"
Aspect	Compass	"
Elevation	Altimeter	"
Total width	Metric tape	"
Erosion	Qualitative assessment	"

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS-CPSU, Institute of Ecology, University of Georgia, Athens.

(7) Publications resulting from data:
Bratton et al. 1977. R/RM Rep. #16

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Development of trends information.
Relationship of trail erodability/durability to degree of use, type of use, forest type, response to disturbance of vegetation, soil and geologic criteria, etc.

UFRL DATA SETS

(1) Project (or data base) name: Appalachian Trail and Shelter Impact Study

(2) File index category and project number: N4615-07

(3) Period (month/year) of data collection: From: May 1984 To: Aug. 1984

(4) Short description: Surveyed Appalachian Trail and shelters along it to determine impacts and develop a model to predict future impacts

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Numerous trail characteristics		
Soil type		
Soil texture		
Infiltration rate		
Trail use characteristics		

(6) Project principal investigator(s) name/present location:
John 8urde, Jim Renfro, So. Illinois Univ.

(7) Publications resulting from data:
Jim Renfro's M.S. Thesis; reports to NPS

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

UFRL DATA SETS

(1) Project (or data base) name: Denver Service Center GRSM maps

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1935 To: Present

(4) Short description:

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Denver Service Center, Technical Information Center, 755 Parfet St.,
P.O. Box 25287, Denver, CO 80225

(7) Publications resulting from data:

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

II. A.2.a. Fish and Benthic Macroinvertebrates

UPFI DATA SETS

(1) Project (or data base) name: Lynn Camp Experimental Creel Study

(2) File index category and project number: N-1423

(3) Period (month/year) of data collection: From: 4/80 To: 6/80

(4) Short description: Creeled each angler, determined number of fish caught and size and weight of each fish. Developed population estimates.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Length	Ruler (fish board)	Daily
Weight	Spring scales	Daily
Population size	Electrofishing	Beginning & end
Creel numbers	Questionnaires	Daily

(6) Project principal investigator(s) name/present location: Steve Moore,
Florida State Game and Fish Commission
7630 Coral Drive, West Melbourne, FL 32901

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Rainbow Trout Removal Effects on Brook Trout Populations

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 6/76 To: 9/79

(4) Short description: Weights, lengths of all trout captured, population estimates, changes in population sizes. Stream discharge, water chemistry, gradient.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Length	Ruler (fish board)	Annually
Weight	Spring scales	"
Stream width	Tape rule	"
Stream gradient	Clinometer	"
pH	pH meter	"
Current velocity	Pygmy Gurley meter	"
Species type	Visual observation	"

(6) Project principal investigator(s) name/present location: Steve Moore,
7630 Coral Drive, W. Melbourne, FL 32901

(7) Publications resulting from data:
NPS-SERO Research/Resources Management Report No. 37

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Large Stream Survey

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 6/79 To: 2/82

(4) Short description: Population estimates, length frequency distribution, lengths, weights.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Fish presence	Electrofishing	Annual
Length of trout	Ruler (fish board)	"
Weight of trout	Spring scales	"
Non-trout weight	Total by species	"
Non-trout number	Total by species	"

(6) Project principal investigator(s) name/present location:

John Boaze, Cherokee, NC

Steve Moore, 7630 Coral Drive, W. Melbourne, FL 32901

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: North Carolina Statewide Basic Water Monitoring Program

(2) File index category and project number: N3617

(3) Period (month/year) of data collection: From: 8/81 To: Present

(4) Short description: Benthic macroinvertebrates and water chemistry samples from Cataloochee Creek are analyzed as part of the state's trends monitoring program.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Benthic macro-invertebrates	Qualitative samples	Annually
Water chemistry	Field kits	Monthly

(6) Project principal investigator(s) name/present location:

Dave Penrose, North Carolina Division of Environmental Management,
P.O. Box 27687, Raleigh, NC 27611

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Comparison of Wild and Hatchery Brook Trout

(2) File index category and project number: N1423-04
(3) Period (month/year) of data collection: From: 4/75 To: 11/75

(4) Short description: Feeding habits, interspecific competition, and growth of hatchery incubated wild trout fingerlings versus Maryland hatchery brook trout strain.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Benthic macroinvertebrates	Surber, artificial substrate, and qualitative samples	Monthly
Food orgs. in stomaches	Number, volume, frequency	Once
Number of blacknose dace	Electrofishing	
Length of trout fingerlings	Fish measuring board	Monthly
Weight of trout fingerlings	Spring scales	Monthly
Water chemistry	Hach kit DR-EL	Twice

(6) Project principal investigator(s) name/present location: W. Douglas Harned, 7537 Scenic View Drive, Knoxville, TN 37918

(7) Publications resulting from data: Harned, W. D., 1976. NPS-SERO Research/ Resources Management Report No. 8. 72 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: USFWS Fish Survey, 1953-1959

(2) File index category and project number: N1423
(3) Period (month/year) of data collection: From: 1953 To: 1959

(4) Short description: Files on electrofishing samples taken by R. E. Lennon.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
No. of fish	Electrofishing, cresol	Variable
Fish length	Fish measuring board	
Fish weight	Spring scales	

(6) Project principal investigator(s) name/present location: R. E. Lennon, P.O. Box 74, Lincoln, Maine 04457

(7) Publications resulting from data: Lennon and Parker. 1960. Trans. Am. Fish. Soc. 89:263-270. Lennon. 1967. USDI Bur. of Sport Fish & Wildl. Tech. Paper #15. Lennon and Parker. 1957. Trans. Am. Fish Soc. 85:234-240.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Fish Bibliography

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: To: 1975

(4) Short description: Computer coded FORTRAN sheets listing all reference material, published or unpublished, available on fish at Great Smoky Mountains National Park.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Ecology Distribution Anatomy/Physiology Taxonomy Location of reference	Each reference coded according to various biological parameters	Once

(6) Project principal investigator(s) name/present location:
Janice Carmichael, University of Tennessee

(7) Publications resulting from data: Carmichael, J. 1979. The fish of the Great Smoky Mountains National Park. Great Smoky Mountains Natural History Assoc. 59 p.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Brook Trout-Rainbow Trout Interactions

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 6/78 To: 9/79

(4) Short description: Backpack electrofishing of 100-m stream segments, including allopatric and sympatric poppulations.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Stream elevation, width, depth, fish species number, weight, length	Backpack electroshocker fish measuring board, spring scales, clinometer altimeter, tape measure, meter stick.	Once per section

(6) Project principal investigator(s) name/present location:
Gary Larson, NPS Midwest Regional Office, Omaha, NE
Steve Moore, 7630 Coral Drive, W. Melbourne, FL 32901

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Anakeesta Leachate Biological Effects

(2) File index category and project number: N3617-10

(3) Period (month/year) of data collection: From: Aug. 1975 To: June 1976

(4) Short description: Study designed to assess Anakeesta formation leachate damage to brook trout populations in Great Smoky Mountains National Park.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Water chemistry	Various lab & Field methods	Monthly
Streamflow	Pygmy Gurley meter	Monthly
Trout: species,	Electrofishing, fish	Once
length, weight, sex,	measuring board, spring	Once
condition, age	scales, etc.	Once
Benthic macro-invertebrates	Surber, qualitative samples	Variable
Stream physical characteristics	Various field and lab methods	Once

(6) Project principal investigator(s) name/present location: Eric L. Morgan, Environmental Biology Research Center, Tennessee Technological University, Cookeville, TN

(7) Publications resulting from data:
Morgan et al. 1976. Tenn. Tech. Univ. Report Series No. 8. 203 pp.

(8) Opportunities for additional use of thesedata or proposals for additional hypotheses to be tested: Data may be useful in trends monitoring.

UPFI DATA SETS

(1) Project (or data base) name: Pesticide and Heavy Metal Survey - Rainbow Trout

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 6/81 To: 7/81

(4) Short description: Pesticide and heavy metal content of rainbow trout collected at high and low elevations from eight streams in Great Smoky Mountains National P

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Chlorinated hydrocarbons	GLC	Once
Organophosphates		"
Heavy metals:	Emission spectrograph	"
HG, Ni, Cd, Co, Cu,	and atomic absorption	"
Mn, Mg, Fe		

(6) Project principal investigator(s) name/present location: Gary Larson, NPS
Midwest Regional Office, Omaha, NE 68102
Steve Moore, 7630 Coral Drive, W. Melbourne, FL 32901

(7) Publications resulting from data: In preparation

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Brook Trout Habitat Characterization

(2) File index category and project number: N1423-04

(3) Period (month/year) of data collection: From: 7/83 To: 10/84

(4) Short description: Correlation study of physical and biological stream parameters with brook trout population size and growth rates

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Fish population size	Backpack shocker	Once
Aquatic insect biomass/ diversity	Surber sampler	"
Water chemistry	Standard methods	"
Current/stream width	Pygmy Gurley meter, tape	"
Cover	Visual observation	"
Bottom composition	Visual observation	"
Large organic debris	Visual observation, tape	"

(6) Project principal investigator(s) name/present location: Mark Alston, UPFI; Jerry West, Biology Dept., Western Carolina University

(7) Publications resulting from data:
In progress.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Sport Fisheries Monitoring

(2) File index category and project number: N1423-03

(3) Period (month/year) of data collection: From: 6/83 To: Present

(4) Short description: Developed and tested a system for monitoring population levels of sport fish within Great Smoky Mountains National Park.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Fish population size/ species composition	Nets, backpack shockers, 200-m sections	Every 3rd year
Water chemistry	Standard methods	" " "
Current/ stream width	Gurley meter/metric tape	" " "

(6) Project principal investigator(s) name/present location: Mark Alston, UPFI; Jerry West, Biology Dept., Western Carolina University

(7) Publications resulting from data:
Historical Trends in Fisheries Studies and a Sport Fisheries Monitoring Plan for Great Smoky Mountains National Park. Res./Resour. Manage. Rep. 1985. In press.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Ross' Fish Survey

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 1960 To: 1961

(4) Short description: Survey of fishes in Great Smoky Mountains National Park by Robert E. Ross.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Fish presence	Alternate polarity electro-seine	Once per stream
Water chemistry:	Various field and lab	"
alkalinity, O_2, total	techniques	"
iron, phosphates,	"	"
conductivity.	"	"
Physical characteristics:	"	"
width, depth, P/R	"	"
ratio, etc.	"	"

(6) Project principal investigator(s) name/present location:
Robert E. Ross (retired; location unknown)

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
N/A

UPFI DATA SETS

(1) Project (or data base) name: USFWS Fish Survey, 1972-1977

(2) File index category and project number: N1423

(3) Period (month/year) of data collection: From: 1972 To: 1977

(4) Short description: Data cards on electrofishing samples during a parkwide stream survey which began in 1972 and continued through 1977.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Fish populations	Electrofishing	Variable
(numbers by species)		
Trout length	No. in each size claSS	
Weight	By size class for trout,	
	total weight for others	
Area of stream sampled	Estimated dimensions	
Population density	Derived from other	
	parameters	

(6) Project principal investigator(s) name/present location:
Allan Kelly - whereabouts unknown.
Ron Jones - Yellowstone National Park, Wyoming

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UFRL DATA SETS

(1) Project (or data base) name: Brook Trout Restoration

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 5/84 To: 10/85

(4) Short description: Determination of sampling effort required to control a rainbow trout population through electroshocking in order to implement a plan for stream management in GRSM

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Water quality	Meters	Annually
Stream characteristics	Tap, clinometer	Annually
Barrier characteristics	Tape	
Fish populations	ELectroshocker	1-5 times/annually

(6) Project principal investigator(s) name/present location:
J. R. Harsson/Resource Management Div., GRSM

(7) Publications resulting from data: M. S. Thesis, Univ, of Tennessee, Knoxville.

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

UFRL DATA SETS

(1) Project (or data base) name: Stream Biota - Camel Hump and Huskey Branch

(2) File index category and project number: N3617

(3) Period (month/year) of data collection: From: 1/79 To: 12/79

(4) Short description: Benthic-macroinvertebrate communities in logged versus unlogged streams were contrasted and compared.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Benthic-macroinvertebrate community structure	Surber sampler, artificial substrate (wire baskets filled with cobbles)	Monthly

(6) Project principal investigator(s) name/present location:
David Silsbee, UPFI

(7) Publications resulting from data:
Silsbee, D. G., and G. Larson. 1983. Hydrobiologia 102, 99-111

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

II. A.2.b. Terrestrial Flora

UFRL DATA SETS

(1) Project (or data base) name: Great Smoky Mountains National Park Vegetation Monitoring - 0.1-ha permanent plots

(2) File index category and project number: N1433-29

(3) Period (month/year) of data collection: From: 1977 To: 1982

(4) Short description: 297 permanently marked 20 x 50 m plots have been established, mostly from 1977-1980 and mostly in the western end, Tennessee side of the park.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Trees $\geq$ 10 cm dbh	Diam. tape to 1 cm	Once
Tree map	30 m tape, rangefinder, compass	"
Saplings 1-10 cm dbh	Diam. tape to 1 cm	"
Shrubs - cover	Percent estimate	"
Shrubs basal diam.	3 Classes: 0-2, 2-6, >6 mm	"
Herb - cover	Percent estimate	Ca 3x in hog rooting stu
Site factors	Altimeter, compass, clinometers, etc.	Once
Canopy openness	Convex mirror, 25 pts.	Once

(6) Project principal investigator(s) name/present location: Mark Harmon, Botany Dept., Oregon State University, Corvallis, OR; Peter White, UPFI; Susan Bratton, NPS, CPSU, Univ. of Georgia, Athens.

(7) **Publications resulting from data:** Harmon, M. 1980. Unpubl. MS Thesis, Univ. Tennessee, Knoxvillee; Bratton, S. P. 1979. Proc. Annu. Conf. SE Assoc. Fish & Wildl. Agencies 33:305-312; Bratton et al. 1982. Castanea 47:230-242; Calloway, R. 1983. Unpubl. MS Thesis, Univ. Tennessee; Nicholas, N. S. 1984. Unpubl. MS Thesis, Univ. Tennessee; E. Arends. 1981. Unpubl. MS. Thesis, Univ. of Tennessee.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Plots can be used as a base for studies on wild boar impact, fire, succession, animal population, soil processes. Data can be used in studies of bird populations, small mammal populations, soil chemistry, stand dynamics, tree mortality.

UFRL DATA SETS

(1) Project (or data base) name: Campsite Impact Study

(2) File index category and project number: N1433-29

(3) Period (month/year) of data collection: From: 5/78 To: 11/78

(4) Short description: 32 Permanently marked 20 x 50 m plots placed in and around 7 or 8 backcountry sites.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
DBH of woody plants	Tapes	Once
Plant cover	Observation	"
Environmental parameters	"	"
Topographic parameters	"	"
Fuels, stumps	"	"
Canopy openness	"	"
Human impact	"	"

(6) Project principal investigator(s) name/present location: Linda Stromberg (McKervey), 1562 Third Ave.,' New York, NY 10028; Susan Bratton, NPS-CPSU, Univ. of Georgia, Athens.

(7) Publications resulting from data:
Bratton and Stromberg. 1979. Proc. 2nd Annu. Conf. on Research in National Parks; Bratton et al. 1982. Environ. Manage. 6(1):63-71.

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:
Vegetation mapping and description.
Vegetation dynamics at the campsites studied.

UPFI DATA SETS

(1) Project (or data base) name: Houston Chambers Pond Flora

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 9/81 To: 11/81

(4) Short description: Random quadrats were sampled and permanently mapped on the flora of Houston Chambers Pond to characterize this rare habitat and to monitor hog rooting and successional change.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Cover - frequency density	1 x 1 m quadrats	Baseline data only

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
wild hog: succession monitoring

UPFI DATA SETS

(1) Project (or data base) name: Foothills Parkway EIS: Vegetation Studies

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 2/77 To: 5/77

(4) Short description: As part of the Foothills Parkway environmental impact research, Jill Baron sampled vegetation from Townsend to Cosby, Tennessee.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement

--Documentation not currently available--

(See Publications below)

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS CPSU, University of Georgia, Athens

(7) Publications resulting from data:
Baron, J. S., and R. C. Mathews, Jr. 1977. Environmental analysis of the proposed Foothills Parkway. Res./Resour. Manage. Rep. 13.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Exclosures

(2) File index category and project number: N1433-25

(3) Period (month/year) of data collection: From: Ca 1975 To: 8/81

(4) Short description: Four sets of data are involved: (1) Bratton-Singer exclosures of ca 1975-1977, (2) recent exclosures (1980-1982); (3) 1984-1985 special protecti areas exclosures and new beech exclosures, and (4) 0.1-ha plots.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurem
Tree dbh	Diameter tape	Once
Tree densities	All stems counted in plot	"
Shrub - cover	Percent, 2 x 2 m plots	"
density	Counts, 2 x 2 m plots	"
diameter	Basal, with ruler, 2 x 2 m plots	"
Herbs - cover	Percent, 1 x 1 m plots	1-3X/year
Percent hog rooting	Estimate	1-3X/year

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:
Bratton, S.P., M. E. Harmon, and P. S. White. 1982. Castanea 47:230-242.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Assessment of soils, plant production, terrestrial vertebrates, etc.

UPFI DATA SETS

(1) Project (or data base) name: Grassy Balds - Lindsay and Bratton

(2) File index category and project number: N1433-31

(3) Period (month/year) of data collection: From: 1976 To: 1977

(4) Short description: Sampling was done on grassy balds and other high elevation disturbed areas; management trials were undertaken; grassy balds situation was summarized.

(5)(a) Parameters measured (b) Equipment/procedures used (c) Frequency of measurement

--See publications cited below--

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS-CPSU, University of Georgia, Athens.

(7) Publications resulting from data: NPS-SERO Res./Resour. Manage. Reps. 4, 17, 26. Lindsay and Bratton. 1979. Also: 1979. Bull. Torrey Bot. Club 106:264-275; Environ. Manage. 3:417-430; Castanea 45:75-87.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Data form a backdrop to monitoring efforts but did not include permanent plots (some plots roughly mapped).

UPFI DATASETS

(1) Project (or data base) name: Grassy Balds - Components of Succession

(2) File index category and project number: N1433-31

(3) Period (month/year) of data collection: From: 6/81 To: 7/82

(4) Short description: Two components of succession were analyzed: seedling establishment and extension growth rates of established woody plants. Carried out by EARTHWATCH.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Seedling densities	1 x 1 m quadrats	Once
Shrubs and saplings	2 x 2 m quadrats	"
Extension growth	Cm of yearly growth of longest shoot	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Seedling survey could be repeated to periodically verify slow establishment rate where grass turf is healthy.

UPFI DATA SETS

(1) Project (or data base) name: Grassy Balds: Radford's M.S. Thesis

(2) File index category and project number: N1433-31

(3) Period (month/year) of data collection: From: 1966 To: 1967

(4) Short description: Three balds were sampled: Andrews, Gregory, and Spence; climatic stations were set up; experimental transects were carried out; plots were permanently marked.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Temperature	Max.-Min. thermometers	Weekly
Relative humidity	Hygrothermograph	"
Wind speed	Anemometer	"
Precipitation	Rain & snow gauges	"
Solar radiation	Pyranograph	"
Soil temperature	Temperature probe	"
Seedling survival	Transplant plots, controls	Once per year
Tree growth rates	Increment cores	Once only
Seedling invasion	0.01 acre "permanent" plots	Once per year

(6) Project principal investigator(s) name/present location:
Radford, S. W., whereabouts unknown;
Ed Clebsch, Botany Dept., Univ. of Tennessee, Knoxville, TN

(7) Publications resulting from data:
Radford, S. W. 1968. Unpublished M.S. Thesis, Univ. of Tennessee, Knoxville

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
May be useful in monitoring of grassy balds succession.

UPFI DATA SETS

(1) Project (or data base) name: Grassy Bald Restoration

(2) File index category and project number:

(3) Period (month/year) of data collection: From: June 1983 To: Present

(4) Short description: Removal of woody encroachment onto the grassy parts of the bald. Monitor and control woody regrowth; monitor the reestablishment of grassy and nonwoody species as bald cover.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Area grassy vs. area woody rate of regrowth Herbicide effectiveness Soil characteristics	Staff compass, air photos 50 m tape 35 mm camera Grids and transects Veg. plots on grid/transect Photo points on grid/transect Hand cutting tools Chain saws/weedeater, backpack sprayer	Once/year

(6) Project principal investigator(s) name/present location: Donald W. Simon, Resources Management, GRSM

(7) Publications resulting from data: N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Herbicide effectiveness study; habitat expansion by uncut plants; population studies on animal or plant communities; rates of succession study between managed and unmanaged blads; historic photo point studies for archives data, etc.

UPFI DATA SETS

(1) Project (or data base) name: Exotic Vegetation Control: Mimosa, Kudzu, Princess Trees, etc.

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1960s To: Present

(4) Short description: Removal and control of exotic plants within the boundaries of GRSM.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rates of regrowth Area covered by exotics Control/effectiveness of herbicides Herbicides effects on nontarget species and soil	Staff compass, 50 m tape 35 mm camera, data notebooks Grid mapping, hand cutting tools, power tools, backpack sprayer Herbicides Effectiveness measured by regrowth rates, visual inspection. Sites located by mapping, using landmarks, maps, and drainage locatio	4 times/year

(6) Project principal investigator(s) name/present location: Don Simon, Steve Martin, Resources Management, GRSM.

(7) Publications resulting from data: N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Grassy Balds: Bye Maps

(2) File index category and project number: N1433-31

(3) Period (month/year) of data collection: From: 1944 To: 1944

(4) Short description: The only early grassy balds maps are those by A. E. Bye, evaluated in several subsequent research projects, including Lindsay and Bratton projects.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
A. E. Bye

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Continued monitoring; management restoration to original boundaries.

UPFI DATA SETS

(1) Project (or data base) name: Bryoecology of Spruce-Fir Forest

(2) File index category and project number: N1433

(3) Period (month/year) of data collection: From: 1958 To: 1963

(4) Short description: A survey of bryophytes of the spruce-fir zone, using a variety of substrates.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Bryophyte cores by 10 percent classes	Four 10 x 10 cm quadrats	Once

(6) Project principal investigator(s) name/present location:
D. H. Norris, location unknown;
A. J. Sharp, Botany Dept., Univ. of Tennessee, Knoxville

(7) Publications resulting from data:
Norris, D. H. 1964. Unpublished Ph.D. Dissertation, Univ. of Tennessee, Knoxville.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Background data for air pollutant impact monitoring using bryophytes.

UPFI DATA SETS

(1) Project (or data base) name: Photo Monitoring: George Ramseur

(2) File index category and project number: N1433

(3) Period (month/year) of data collection: From: 1950s To: Present

(4) Short description: Ramseur has set up formal photo-points to monitor grassy bald succession (Andrews), Mt. Buckley burn scar, heath balds, landslide scars.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
G. Ramseur, Biology Dept., University of the South, Sewanee, TN

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Integration into environmental monitoring program; dramatic when used in interpretation.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Patterns One-Half Century After Chestnut Blight

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 7/80 To: 9/80

(4) Short description: Succession after chestnut blight in GRSM. 23 0.1-ha permanent plots, 10 0.1-ha nonpermanent plots, and 5 nonpermanent 20 x 30 m plots.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree dbh (>1 cm)	Tape measure	Once
Environmental parameters	Observation	
Percent shrub cover	"	
Plot location	"	

(6) Project principal investigator(s) name/present location:
Ernesto Arends, Venezuela
Frank McCormick, Graduate Program in Ecology, Univ. of Tennessee, Knoxville.

(7) Publications resulting from data:
Arends, E. 1981. Unpublished M.S. Thesis, Univ. of Tennessee, Knoxville. 78 p.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Vegetation classification, monitoring, mapping.
Use of permanent plots by other researchers.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: Landsat Imagery

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1978 To: 1980

(4) Short description: Interpretation of Landsat imagery of area near Newfound Gap; imagery was used in a carbon model (wt. organic matter/ha); large scale and preliminary.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:

Jerry Olson, Environmental Sciences Div., Oak Ridge National Laboratory, Oak Ridge, TN

(7) Publications resulting from data:

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

Inventory of all vegetation mapping attempts.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: Camel Hump and Huskey Branch

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1979 To: 1980

(4) Short description: Short reconnaissance units to Camel Hump Creek and Huskey Branch watersheds, sampled with a Bitterlich prism, made crude cover type maps (water quality project).

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:

Mark Harmon, Botany Dept., Oregon State University, Corvallis, OR

(7) Publications resulting from data:

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Miller 1930s Vegetation Survey and Map

(2) File index category and project number: N1433-18

(3) Period (month/year) of data collection: From: 1935 To: 1938

(4) Short description: Data set includes information on overstory and understory vegetation and environmental and disturbance information for 1,378 0.08-ha (0.2 acre) plots.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree species	4" dbh size classes	Once/plot
Brush & ground cover	The dominant species was recorded in each of 0.001 acre plots	" " "
Elevation	Barometer	"
Litter depth	Ruler	"
Vegetation type	Observation	"
Slope and exposure	Observation	"
Fire history	Records	"
Soil parameters	Observation	"

(6) Project principal investigator(s) name/present location:
Mark MacKenzie, Peter White, UPFI; Frank Miller, Waynesville, NC

(7) Publications resulting from data:
Walker, G. R. 1978. Unpublished M.S. Thesis, Western Carolina Univ., Cullowhee, NC; MacKenzie, M. D., and P. S. White. 1983. ASB Bull. (Abstr.)

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: This is the largest quantative data set on GRSM vegetation. Some plots can probably be reinventoried from topographic maps. The data is being used in model validation by M. D. MacKenzie.

UPFI DATA SETS

(1) Project (or data base) name: Ground Control Data for Landsat Imagery of spruce-fir/hardwood ecotone.

(2) File index category and project number: N1433-33

(3) Period (month/year) of data collection: From: 4/69 To: 10/69

(4) Short description: About 90 plots in lower to middle elevation of the spruce-fir zone in the vicinity of Clingmans Dome - mostly in the upper Little River basin.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement

--No documentation currently available--

(6) Project principal investigator(s) name/present location:
H. R. DeSelm, Botany Dept., University of Tennessee, Knoxville.
D. C. West, Environmental Sciences Div., Oak Ridge National Lab., Oakridge, TN

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Vegetation monitoring in spruce-fir zone and balsam woolly aphid work.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: Spruce-Fir Zone

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1981 To: 1982

(4) Short description: Mapped vegetation types of spruce-fir zone, using aerial photographs and a list of vegetation types. Random points used to record data on type distribution from these maps.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:

Chris Eagar, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: High Elevation Opening

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1981 To: 1982

(4) Short description: Mapped high elevation (>ca 4,000 ft) treeless plant communities: balds (grassy and heath), landslide scars, clearings; random points used to characterize heath bald distribution.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Don Stratton, Ecology and Systematics Dept., State Univ. of New York, Stony Brook.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Fire Scar Records, Western GRSM

(2) File index category and project number: N1433

(3) Period (month/year) of data collection: From: 1977 To: 1979

(4) Short description: Collected fire scar data and reported fire frequencies from western GRSM

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Mark Harmon, Botany Dept., Oregon State Univ., Corvallis.

(7) Publications resulting from data:
Harmon, M. E. 1982. Bull. Torrey Bot. Club 109:74-79

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Disturbance documentation for GRSM

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: Fires Pre-1945

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1980 To: 1981

(4) Short description: Searched GRSM archival maps for fire records; mapped 28 fires before 1945 and constructed an indexed list of these, citing date, fire size, and source of data.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Mark Harmon, Botany Dept., Oregon State Univ., Corvallis.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Further documentation of pre-1945 fires is needed; this is a preliminary list of these fires only.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Maps: Fires 1940-1979

(2) File index category and project number: N1433-26
(3) Period (month/year) of data collection: From: 1975 To: 1980

(4) Short description: Mapped all fires from Resources Management fire records for the period 1940-1979.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:

Mark Harmon, Botany Dept., Oregon State University, Corvallis.

(7) Publications resulting from data:

Harmon, M. E. 1981. NPS-SERO Res./Resour. Manage. Rep. No. 46

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

Documentation of fire history for specific study sites; continued succession monitoring

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UPFI DATA SETS

(1) Project (or data base) name: GRSM Aerial Photography/Imagery

(2) File index category and project number: N1433
(3) Period (month/year) of data collection: From: 1930s To: Present

(4) Short description: This data set consists of a list of available aerial photography and remote sensing data or indexes thereof.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:
N/A

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:
Landscape analysis; vegetation map

UPFI DATA SETS

(1) Project (or data base) name: GRSM Fire Records

(2) File index category and project number: N1433

(3) Period (month/year) of data collection: From: Ca 1930s To: Present

(4) Short description: GRSM fire records are continuously updated and kept at Resources Management Div.; Mark Harmon constructed a system for coding and analyzing these.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Location	USGS maps	Once/fire
Site features	USGS maps	"
Fire cause	Man vs. natural	"
Forest type	Percent in classes	"
Fire type	Scalars	"
Fire size	USGS maps	"
Fire weather	Descriptive	"
Management & action	Descriptive	"

(6) Project principal investigator(s) name/present location:

Mark Harmon, Botany Dept., Oregon State Univ., Corvallis
Peter White, UPFI

(7) Publications resulting from data:

Harmon, M. E. 1981. NPS-SERO Res./Resour. Manage. Rep. No. 46

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Annual summaries of fire statistics. Documentation of study site characteristics. Continued postfire monitoring for succession, tree regeneration; analysis of fire effects on other habitat characteristics.

UPFI DATA SETS

(1) Project (or data base) name: LeConte Vegetation Survey

(2) File index category and project number: N1433-26

(3) Period (month/year) of data collection: From: 1976 To: 1976

(4) Short description: Vegetation survey and mapping project

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Ground layer	Coverage estimate	Once
Trees >3.5" dbh	By 1" diameter classes	"
Trees <3.5" dbh	Counted by species	"
Dense ericaceous plots	5 x 5 m subplots	"
Soil pits	Soil profile descriptions	"
Topographic info.	N/A	"

(6) Project principal investigator(s) name/present location:

Burton Barnes, School of Natural Resources, Univ. of Michigan, Ann Arbor, MI 48109

(7) Publications resulting from data:

Livingston and Mitchell. 1976. Site classification and mapping in the Mount LeConte growth district, GRSM. Unpublished report.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

N/A

UPFI DATA SETS

(1) Project (or data base) name: GRSM Vegetation: Reinventory of Miller's Cove Plot

(2) File index category and project number: N1433

(3) Period (month/year) of data collection: From: Ca 1976 To: 1977

(4) Short description: A relocation (with permanent marking stakes) of 25 cove hardwood plots from 1930s data of Frank Miller

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Trees (≥ 10 cm dbh)	Tallied according	Twice, 1930s and
density	to ht. in diameter	1970s
frequency	classes	"
basal area		"
Dominant shrubs	2 x 2 m subplots	"

(6) Project principal investigator(s) name/present location:
Gary Walker, Botany Dept., Univ. of Tennessee, Knoxville

(7) Publications resulting from data:
Walker, Gary L. 1978. Unpublished M.S. Thesis, Western Carolina University, Cullowhee, NC. 71 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Integration into monitoring program.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Recovery Following Southern Pine Beetle Infestations

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: Ca 1976 To: 1977

(4) Short description: N/A

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Trees ≥ 10 cm dbh	0.04-ha circular plot	Once
Trees 3-10 cm dbh	"	"
Dead trees by size class	"	"
Percent cover, shrubs	"	"
Trees >1 m tall, <3 in dbh	0.004-ha circular plots	"
Trees <1 m tall	"	"
Herb cover	Four 1 x 1 m plots	"
Elevation	USGS maps	"
Slope position	USGS maps	"
Slope aspect	Silva compass	"
Slope steepness	Abney level	"
Depth to bedrock	Soil auger	"

(6) Project principal investigator(s) name/present location:
Nat Kuykendall, NPS Denver Service Center

(7) Publications resulting from data: Kuykendall, N. W. 1978. Unpublished M.S. Thesis, Univ. of Tennessee, Knoxville. 122 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Continued GRSM monitoring of vegetation.

UPFI DATA SET

(1) Project (or data base) name: Secondary Succession in the Spruce-Fir Zone

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: Ca 1970 To: 1975

(4) Short description: Established mapped study plots in three areas in the general vicinity of Andrews Bald to Mount Buckley

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree circumference	Tape rule	Once
Tree height	Reference pole	"
Radius of drip line	Tape rule	"
Tree age	Increment core	"
Distance and azimuth	Compass, tape rule	"
From reference pt. to tree		"
Photo point	Not specified	"

(6) Project principal investigator(s) name/present location:
George S. Ramseur, Dept. of Biology, Univ. of the South, Sewanee, TN 37375

(7) Publications resulting from data:
Ramseur, G. S. 1976. NPS-SERO Res./Resour. Manage. Rep. No. 7. 37 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Grassy balds monitoring; succession monitoring and research.

UPFI DATA SET

(1) Project (or data base) name: Vegetation of Chilhowee Mountain

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 1962 To: 1966

(4) Short description: Vegetation map and other information

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Canopy basal area	Plots, Bitterlich prism	Once
Tree diameter	Estimated	"
Tree density, frequency	Derived from basal area, diameter	"
Shrubs	1/40 acre circular plot	"
Seedlings of trees	0.01 acre circular plot	"

(6) Project principal investigator(s) name/present location:
R. D. Thomas, Northeast Louisiana Univ., Monroe, LA 71201
H. R. DeSelm, Botany Dept., Univ. of Tennessee, Knoxville

(7) Publications resulting from data:
Thomas R. D. 1966. Unpublished Ph.D. Dissertation, Univ. of Tennessee, Knoxville. 355 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Fire management trials, western GRSM
Vegetation monitoring near Look Rock, along Foothills Parkway

UPFI DATA SETS

(1) Project (or data base) name: White Pine - Hardwood Survey

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: June 1977 To: Oct. 1977

(4) Short description: Based on white pine areas of Miller's original vegetation map but using only western GRSM plots; 1,440 plots were sampled in 34 stands.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Trees 10 cm dbh	0.0406-ha plot	Once
Saplings 2.5-10 cm dbh	"	"
Subsaplings 2.5 cm, 74" tall	Two 6' wide transects	"
Shrubs, vines, seedlings, herbs	Two 1 x 1 m plots	"
Canopy closure	Percent estimated	"
Surface rock	To nearest 5%	"
Slope position	Subjective, plus %	"
Elevation	Pocket altimeter	"
Aspect	Silva compass	"
Slope angle	Abney level	"
Slope shape	Subjective	"
Soil pit	Thickness of horizons	"

(6) Project principal investigator(s) name/present location:
Harry R. DeYoung, Maryville, TN.; H. DeSelm, Botany Dept. Univ. of Tennessee, Knoxville, TN.

(7) Publications resulting from data: DeYoung, H. R. 1979. Unpublished M. S. Thesis, Univ. of Tennessee, Knoxville. 190 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Golden's Survey of the Central Smokies

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 1969 To: 1970

(4) Short description: 283 Plots, each 0.08 ha, were sampled.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Cover to nearest 10%	0.08-ha circular plots	Once
Trees 12.7 cm dbh	Tallied on 0.08-ha plots	"
Saplings 2.5-12.7 cm dbh	Tallied on 0.04-ha subplots	"
Seedlings, shrubs, vines	0.004-ha subplots	"
Herbs	Cover % on 0.004 ha subplot	"
Slope aspect	Compass	"
Slope angle	Abney level	"
Slope shape	Subjective classes	"
Elevation	Pocket altimeter	"
Soil variable	Variable	"

(6) Project principal investigator(s) name/present location:

Michael S. Golden, Dept. Forestry, Auburn Univ., Auburn, AL;
H. R. DeSelm, Botany Dept., Univ. Tennessee, Knoxville.

(7) Publications resulting from data:

Golden, M.S. 1974. Unpublished Ph.D. Dissertation, Univ. Tennessee, Knoxville.
Golden, M. S. Am. Midl. Nat. 106:37-53.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
If plot maps exist, it could be used in ground truth for vegetation mapping or monitoring.

UPFI DATA SETS

(1) Project (or data base) name: Post-Logging Succession

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: Ca 1976 To: 1977

(4) Short description: Plot size varied; total plot number is not given in the thesis per se.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree density	Variable plot size	Once
Tree basal area		"
Tree regeneration		"

(6) Project principal investigator(s) name/present location:
W. H. McCraken, III, location unknown;
Ed Buckner, Dept. of Forestry, Univ. of Tennessee, Knoxville

(7) Publications resulting from data:
McCraken, W. H. III. 1978. Unpublished M.S. Thesis, Univ. of Tennessee, Knoxville, 87 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Postlogging succession studies and vegetation map
Ground truth

UPFI DATA SETS

(1) Project (or data base) name: Impacts on Spruce-Fir Forests

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 1975 To: 1978

(4) Short description: An evaluation of disturbance in and management problems of spruce-fir; includes resample of original Oosting-Billings plots.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree diameter	10 x 10 m plots, tapes	Once
Spruce and fir age	Increment cores	"
Shrub cover %	2 x 2 m subplot	"
Herb cover %	2 x 2 m subplot	"
Slope	Not specified	"
Elevation	"	"
Aspect	"	"

(6) Project principal investigator(s) name/present location:
Paul R. Saunders, Univ. of Washington, Seattle.

(7) Publications resulting from data:
Saunders, P. R. 1979. Unpublished Ph.D. Dissertation, Duke Univ., Durham, NC. 177 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Possible integration into GRSM vegetation monitoring program.
Continued monitoring of spruce-fir disturbance.

UPFI DATA SETS

(1) Project (or data base) name: Remeasurement of 1959-1962 Whittaker/Becking Plots

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 1976 To: 1977

(4) Short description: Oak Ridge National Laboratory contracted R. W. Becking to reinventory 10 of the original plots. Included are location, plot tree maps, field data, and more summary work.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree species	20 x 50 m permanent vegetation plots	Once
Tree diameters		"
Environmental data	"	"
Trees mapped	"	"
Plot mapped	"	"

(6) Project principal investigator(s) name/present location:
Rudolf W. Becking, Humboldt State Univ., Arcata, CA

(7) Publications resulting from data:
Becking and Olson. 1978. Oak Ridge National Laboratory Environmental Science Div. Publication #1111 (ORNL/TM-6083). 98 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Forest succession, vegetation monitoring, mapping.

UPFI DATA SETS

(1) Project (or data base) name: Balsam Woolly Aphid/Fraser Fir Infestation

(2) File index category and project number: N1433-30

(3) Period (month/year) of data collection: From: 6/76 To: 9/77

(4) Short description: One hundred thirty-one 10 x 10 meter plots throughout the spruce-fir zone. Plot locations are shown on maps and described on data sheets; 4 witness trees, 2-3 photos each plot.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
DBH of trees	10 x 10 m plots	Once
Seedling counts	Five 1 x 1 m plots or 1 x 10 m strip	"
Environmental data	Elevation, slope, aspect (standard methods)	"
Balsam woolly aphid infestation	5 classes	"
Height, age, crown class	For 3 fir trees per plot	"

(6) Project principal investigator(s) name/present location:
Christopher Eagar, UPFI

(7) Publications resulting from data:
Hay, R. C., C. Eagar, and K. Johnson. 1978. Contract report to NPS SERO Chief Scientist, Atlanta, GA.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Baseline data for determination of changes in vegetation structure following balsam woolly aphid caused death of Fraser fir.

UPFI DATA SETS

(1) Project (or data base) name: Mount LeConte Landslides

(2) File index category and project number: N1433-20
(3) Period (month/year) of data collection: From: 6/79 To: 8/80

(4) Short description: Survey of landslide scar plant communities on Mount LeConte

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Susan Feldkamp, Dept. of Biology, University of Wyoming, Laramie.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Rare plant location maps and rare habitat characterization

UPFI DATA SETS

(1) Project (or data base) name: Heavy Fuel Loadings in Pine and Spruce-FIr

(2) File index category and project number: N1433-31
(3) Period (month/year) of data collection: From: 6/83 To: 9/83

(4) Short description: Heavy fuel loadings occur in pine stands and spruce-fir due to past disturbance (pine bark beetle and balsam woolly aphid, respectively).

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Environmental data	Altimeter, clinometer, compass	Once
Forest & understory type	Observation	"
Dead & downed woody material	Planar intercept method	2 transects
Organic soil layers	Ruler	3 pits
Standing dead trees	1-factor Bitterlich prism	"

(6) Project principal investigator(s) name/present location:
Niki Nicholas, UPFI
Univ. of Tennessee Graduate Program in Ecology

(7) Publications resulting from data: Nicholas, N. S., and P. S. White. 1984. The effect of the southern pine beetle on fuel loading in yellow pine forests of GRSM. USDI, National Park Service, SE Region Res./Resour. Manage. Rep. SER-73. Nicholas, N. S., and P. S. White. In review. The effect of the balsam woolly apnid on fuel levels in spruce-fir forests of GRSM.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Pre-park Timber Tallies

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 192? To: 1930

(4) Short description: Timber tallies/inventories filed by watershed. Used by TN and NC park commissions to determine value of land. Line transects were used - some maps included

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree diameter		
Tree species		

(6) Project principal investigator(s) name/present location:

N/A

(7) Publications resulting from data:

N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Land use history: pre-park forest vegetation.

UPFI DATA SETS

(1) Project (or data base) name: Vegetation Production Study

(2) File index category and project number: N1433-20

(3) Period (month/year) of data collection: From: 1959 To: 1962

(4) Short description: Vegetation plot data, dry weight of plants and plant parts.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vegetation plots		
Dry weights	Various strata	

(6) Project principal investigator(s) name/present location:

R. H. Whittaker - deceased

(7) Publications resulting from data: Whittaker, R. H. 1963. Ecology 44:176-187; 1962. Ecology 43:357-377; 1961. Ecology 42:177-180; 1966. Ecology 47:103-121. Whittaker and Garfine. 1962. Ecology 43:120-125.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

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UPFI DATA SETS

(1) Project (or data base) name: Nitrogen Dynamics of Forested Ecosystems

(2) File index category and project number: N1433-22

(3) Period (month/year) of data collection: From: 11/80 To: 9/82

(4) Short description: A study to further document the leaching of N from hog-rooted gaps and to determine the pathways of the N cycle involved.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Bulk precip. chemistry	Standard methods, Coweeta	Weekly
Soil moisture chemistry	Hydrological Lab	"
Streamwater chemistry	" "	"
Soil chemistry	" "	"
Woody biomass	Diameter tape at 1.4 m	Once

(5) Project principal investigator(s) name/present location:
Wayne Swank, US Forest Service, Coweeta Hydrological Lab, Otto, NC
Gary Larson, NPS CPSU, Oregon State University, Corvallis

(7) Publications resulting from data:
Singer, F., W. Swank, and E.E.C. Clebsch. Manage. Rep. 54, NPS, Southeast Region, Atlanta, GA

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Exotic Plants: 1975 Survey of Woody Plants

(2) File index category and project number: N1433-14

(3) Period (month/year) of data collection: From: Summer 1975 To: Summer 1975

(4) Short description: Survey of exotic woody plant locations throughout Tennessee side of GRSM

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
No. of plants	Visual count	Once
Total area	m^2	"
Impact on neighbors	Descriptive narrative	"
Forest type	"	"
Understory type	"	"
Site descriptions	"	"

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS-CPSU, Institute of Ecology, Univ. of Georgia, Athens

(7) Publications resulting from data:
Baron, J., et al. 1975. NPS Southeast Region Res./Resour. Manage. Rep. No. 2

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Permanent plot monitoring for spread of exotics

UPFI DATA SETS

(1) Project (or data base) name: Exotic Plants: Kudzu Project

(2) File index category and project number: N1433-14

(3) Period (month/year) of data collection: From: 6/82 To: 10/82

(4) Short description: Files and maps for ca 85 kudzu control plots; inventory of kudzu locations and descriptions of site and population characteristics

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Elevation, impact, gradient	USGS maps	Once
Kudzu: plot area	m^2 or acres	Ca 1/2-3 yrs
cover	Percent	"
evidence of spread	Presence/absence runners	"
Disturbance: description	Scalars	"
Basal area	m^2/ha, Bitterlich prism	"

(6) Project principal investigator(s) name/present location:
Dean Berg, Resources Management Division, Great Smoky Mountains National Park
Peter White, Science Division, Great Smoky Mountains National Park

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Summarization of kudzu site factors; control success to date; trial of new control techniques - used as monitoring data base for any management prescription.

UPFI DATA SETS

(1) Project (or data base) name: TVA Heritage Program Data Base

(2) File index category and project number: N16-01

(3) Period (month/year) of data collection: From: 1976 To: Present

(4) Short description: Data file on rare species (plants and animals), geological or other significant features, pristine ecosystems

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rare species presence/absence	Plant and animal collections	Once

(6) Project principal investigator(s) name/present location:
Heritage Program Director, Tennessee Valley Authority, Norris, TN
For plants: Leo Collins at above address

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Rare animal assessment by watershed and habitat

UPFI DATA SETS

(1) Project (or data base) name: North Carolina Heritage Program Data Base

(2) File index category and project number: N16-01

(3) Period (month/year) of data collection: From: 1975 To: Present

(4) Short description: Data file on rare species (plants and animals), geological or significant features, pristine ecosystems

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rare species presence/absence	Plant collections and animal collections	Once

(6) Project principal investigator(s) name/present location:
Heritage Program Director, North Carolina State Natural Heritage Program, Raleigh, NC

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Rare animal species assessment should be carried out for GRSM.

UPFI DATA SETS

(1) Project (or data base) name: Tennessee Heritage Program Data Base

(2) File index category and project number: N16-01

(3) Period (month/year) of data collection: From: 1975 To: Present

(4) Short description: Data file on rare species, geological or other significant features, pristine ecosystems

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rare species presence/absence	Plant and animal collections	Once

(6) Project principal investigator(s) name/present location:
Heritage Program Director, State Dept. of Conservation, Nashville, TN

(7) Publications resulting from data:
N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Rare animal species assessment for GRSM should be carried out.

UPFI DATA SETS

(1) Project (or data base) name: GRSM Vascular Plants.- H. S. Pepoon

(2) File index category and project number: N1433-13b
(3) Period (month/year) of data collection: From: 4/28/28 To: 9/1/31

(4) Short description: A card file survives in the GRSM herbarium, but actual collections have not been inventoried. These are particularly important since they predate the Univ. of Tenn. herbarium fire of 1934. Plant collections have not been fully assessed, but most are probably at the Illinois Natural History Survey Museum.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plants Presence/absence	Herbarium specimens, floristic manuals	Once

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:
Moran, R. C. 1981. Am. Fern. J. 71-171

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: The search for Pepoon collections should be continued and a complete evaluation of the card file performed with voucher specimens.

UPFI DATA SETS

(1) Project (or data base) name: GRSM Vascular Plants - F. Sargent

(2) File index category and project number: N1433-13b
(3) Period (month/year) of data collection: From: 1920s To: 1920s (dates

(4) Short description: Francis Sargent apparently collected in GRSM in the 1920s, during boundary surveys for the park. These have never been assessed. The location of the data set is presently unknown.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plants presence/absence	Herbarium sheets	Once

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Assessment of and verification of additions to GRSM checklist and rare plant list.

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare and Endangered Vascular Plants

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: 1978 To: 1982

(4) Short description: Three categories of rare plants have been assessed: (1) nationally listed, (2) state listed, and (3) plants rare in GRSM.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Presence/absence	Floristic manuals	
Population location	USGS 7-1/2 quads	
Population size, structure, status	Measured parameters	
Priority	See White 1980 for scalar development	

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data: White, P.S. 1980. NPS Southeast Region R/RM Rep. 33. 41 p. White, P.S., & S. Bratton. 1981. Pp. 265-278 in H. Synge, ed. Biological aspects of rare plant conservation, Ch. 22, John Wiley & Sons. White, P.S. 1981. Tenn. Conserv. 40(5):14-16. White. P.S. 1981. Proc. 2nd Conf. on Scientific Research in National Parks 8:456-59.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Design of air pollutant monitoring in spruce-fir; final management plan for GRSM endemics; all management and construction plans; assure that GRSM protects rare species sufficiently; additional species or specific threats

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UPFI DATA SETS

(1) Project (or data base) name: Vascular Plant Data Base for GRSM and the southern Applachian biotic province

(2) File index category and project number: N1433-13b

(3) Period (month/year) of data collection: From: 1980 To: Present

(4) Short description: Data set includes life history, habitat, rarity, exotic status, distribution, phenological data for all species on the nomenclatural deck. White, Renfro, and MacKenzie 1985 (UPFI internal report) documents data set.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Nomenclature	Herbarium labels, field survey	Yearly update
Life history traits	Standard floristic manuals	" "
Phenology	Standard floristic manuals	" "
Distibution/habitats	Herbarium labels, field survey	" "
Exotic status	" " " "	" "
Rarity	" " " "	" "
Hog foods and impacts	" " " "	" "
Air pollution sensitivity	" " " "	" "

(6) Project principal investigator(s) name/present location:
Peter S. White, UPFI

(7) Publications resulting from data: White, P.S. In press. Proc. Nat. Div. in For. Eco. Workshop, Univ. GA. White, P.S. 1983. Annals Missouri Bot. Garden 70:734-747. P.S. White. 1982 NPS, SE Region R/RM Rep. 55. 219 p. White, P.S. 1982. Castanea 47:78-83.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Can be combined with any project sampling vascular plants to give information on a wealth of plant traits. Phenological data could be refined and flowering displays plotted as a function of habit and season. Analysis of management issues: rarity, development plans, exotic plant status, hog impacts.

UPFI DATA SETS

(1) Project (or data base) name: GRSM Collections: Ramseur's High Mountain Flora

(2) File index category and project number: N1433-13b

(3) Period (month/year) of data collection: From: 1955 To: 1958

(4) Short description: Ramseur's Ph.D. Thesis included a plant collection for all Southern Appalachian peaks over 5,500 ft; collections are at Univ. of North Carolina, Chapel Hill.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plants presence/absence	Herbarium collections	Once

(6) Project principal investigator(s) name/present location:

George S. Ramseur, Biology Dept., University of the South, Sewanee, TN

(7) Publications resulting from data:

Ramseur, G. S. 1960. J. Elisha Mitchell Sci. Soc. 76:82-112

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Expand documentation of high elevation flora by looking at fine-scale distribution.

UPFI DATA SETS

(1) Project (or data base) name: Foothills Parkway Vascular Plant Checklist

(2) File index category and project number: N1433-13b

(3) Period (month/year) of data collection: From: 1962 To: 1973

(4) Short description: Collection and checklist for Chilhowee Mountain, including land managed and owned by NPS as part of Tennessee Foothills Parkway

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plants presence/absence	Herbarium collections	Once

(6) Project principal investigator(s) name/present location:

R. D. Thomas, Northeast Louisiana Univ., Monroe, LA 71201

(7) Publications resulting from data:

Thomas, R. D. 1976. J. Tenn. Acad. Sci. 51:118-123

Thomas, R. D. 1966. Unpublished Ph.D. Dissertation, Univ. of Tenn., Knoxville

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Should be regularly used in Foothills Parkway management plans

UPFI DATA SETS

(1) Project (or data base) name: GRSM Flora: Early Collections - Buckley

(2) File index category and project number: N1433-13b
(3) Period (month/year) of data collection: From: Ca 1840s To: Ca 1840s

(4) Short description: Buckley visited Mount LeConte, Clingmans Dome area; collections are listed in Index Herbariorum.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plants presence/absence	Herbarium collections	Once

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Incoporation into floristic data base
Early rare plant records

UPFI DATA SETS

(1) Project (or data base) name: Collection Notebooks of Albert Ruth

(2) File index category and project number: N1433-13b
(3) Period (month/year) of data collection: From: Ca 1880 To: 1910

(4) Short description: Several early Ruth collections document species in GRSM now thought extinct here; Ruth collections and notebooks probably went to Southern Methodist Univ. at his death.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Vascular plant absence/presence	Herbarium collections	Once

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Possible use in relocating species thought extirpated

UPFI DATA SETS

(1) Project (or data base) name: Field Notes for Early GRSM Collections

(2) File index category and project number: N1433-13b

(3) Period (month/year) of data collection: From: Ca 1928 To: 1940

(4) Short description: Early plant records. Collection logs and notebooks at the GRSM Archives constitute an important documentation of this work.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
N/A	N/A	N/A

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Assessments of rare plant locations as needed

UPFI DATA SETS

(1) Project (or data base) name: GRSM Vascular Plants - Herbarium Computerization

(2) File index category and project number: N1433-13b

(3) Period (month/year) of data collection: From: 1978 To: 1982

(4) Short description: Label data computerized for GRSM, W. Carolina Univ., Univ. of Tennessee; in progress (mapping not complete)

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Label data:	Herbarium labels	Once
Collector, collection	"	"
no., county, date,	"	"
elevation, habitat,	"	"
soils, locale, misc.	"	"
notes, watershed,	"	"
USGS quad.	"	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:
White, P. S. 1981. Proc. 2nd Conf. on Scientific Research in the National Parks 4:47-61

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Computerized mapping of collection locales, construction of a botanical history of GRSM, improvement of herbarium label design.
Design and testing of optimum label design with regard to (1) retention of data, (2) ease of relocation, (3) minimizing errors (e.g. copying errors).

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare Plants: Lilium superbum

(2) File index category and project number: N1433-16
(3) Period (month/year) of data collection: From: 6/82 To: 7/82

(4) Short description: Earthwatch volunteers were used to map lily populations in several hog-rooted areas. Both trail survey and permanent plots were used. The former proved to be of limited usefulness and was not completed.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Plant density, clumping	Hierarchy of nearest neighbor dist.	Once
Plant height	Meter stick to 0.1 m	"
No. of leaf whorls	Count	"
% Rooting and trampling	Within 1 m of plant	"
Canopy cover	Percent	"
Damage to plant	Scalar 0-6	"
Topography/habitat	USGS maps, scalars	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Wild boar impact monitoring

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare Plants: Azaleas of Gregory Bald

(2) File index category and project number: N1433-16
(3) Period (month/year) of data collection: From: 5/82 To: 7/82

(4) Short description: Major part of Earthwatch 1982 project was to map a sample of azaleas on Gregory Bald for monitoring.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Plant height, crown	Meter stick or ruler	Once
length, extension growth	Meter stick of ruler	"
Flower abundance	Scalar 0-3	"
Plants overtopping azalea	Scalar 0-4	"
Plant senescence	Scalar 0-3	"
Rooting site	Scalar 0-3	"
Tree extension growth	Ruler	"
Tree seedling densities	1 x 1 m quadrats	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Monitoring of grassy balds management and its effect on azalea population size and flowering. Data could be used in pollination studies, analysis of flowering and fruiting, vegetative reproduction

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare Plants - *Cacalia rugelia*

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: 7/1/81 To: 7/20/81

(4) Short description: A survey and monitoring program were completed for *Cacalia rugelia*, a GRSM endemic; a subproject of Earthwatch 1981 rare plant project

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Abundance	0-5 scalar	Once
Environment	Altimeter, compass, etc.	"
Basal area	Bitterlich prism	"
	Permanent plots were established with individual plants mapped	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Basis for further work on why this plant is rare (i.e., work on its flowering, seed set, establishment, dispersal)

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare Plants: *Cladrastis kentukea*

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: 4/81 To: 10/82

(4) Short description: A monitoring program for the scarce tree *Cladrastis kentukea* was established; Earthwatch 1981 carried out the main sampling, with further data collection completed in 1982.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree diameter	Diameter tape	Once
No. of sprout stems	Count in 4 size classes	"
Sprout diameters	Diameter tape	"
Leaning angle	Protractor and level	"
Nearest neighbor	In meters, range finder	"
Basal area	Bitterlich prism	"
Sapling densities	1 x 1 m and 2 x 2 m quadrats	"

(6) Project principal investigator(s) name/present location:
Peter White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Influence of geomorphology on cove habitat

UPFI DATA SETS

(1) Project (or data base) name: GRSM Rare Plants: Orchid Study

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: 4/81 To: 7/82

(4) Short description: Susan Bratton's major Earthwatch project in 1981, with follow-up data collected in 1982

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Population density,	Hierarchy, nearest plant distances	Once
Access to poachers	Maps	"
Habitat, topography	Scalars	"
Flowering		"
Plant height	Meter stick, ruler	"
Longest leaf length	Meter stick, ruler	"

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS-CPSU, Institute of Ecology, Univ. of Georgia, Athens.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
To set up orchid monitoring, this data set should be acquired and reviewed.

UPFI DATA SETS

(1) Project (or data base) name: Blue Ridge Parkway Rare Plant Survey

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: 1977 To: 1978

(4) Short description: Inventory of rare plant habitats along Blue Ridge Parkway corridor, including area inside GRSM.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Rare species presence/absence	Herbarium specimens, general descriptions, lists	Once

(6) Project principal investigator(s) name/present location:
J. Dan Pittillo, Biology Dept., Western Carolina University, Cullowhee, NC

(7) Publications resulting from data:
Pittillo and Govus. 1978. A manual of important plant habitats of the Blue Ridge Parkway. Rep. to NPS-SERO, Atlanta, GA

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Ecology of *Pieris floribunda* in GRSM

(2) File index category and project number: N1433-16

(3) Period (month/year) of data collection: From: Ca 1966 To: 1967

(4) Short description: A sampling of 40 individual 0.05 acre plots; *Pieris floribunda* is a rare, state-listed plant

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tree dbh, eight	0.05 acre plots	Once
Shrub diameter, density	0.01-0.02 acre plots	"
Herb cover	% of 0.01 acre plot	"
No. fruit, runners/*Pieris*	0.05 acre plot	"
Soil horizon depths	Tape measure	"
Soil chemistry	Max-min thermometer	"

(6) Project principal investigator(s) name/present location:
Caroline Triplett Wingfield (location unknown)
Ed Clebsch, Botany Dept., Univ. of Tennessee, Knoxville.

(7) Publications resulting from data:
Wingfield, C. T. 1968. Unpublished M.S. Thesis, Univ. of Tennessee, Knoxville.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Monitoring of rare plant population
Continued succession of pine-heath community

UPFI DATA SETS

(1) Project (or data base) name: Completion of Parkwide Fuels Inventory

(2) File index category and project number: N1433-31

(3) Period (month/year) of data collection: From: Oct. 1984 To: Dec. 1984

(4) Short description: Sampling of forest community types not sampled by Harmon in 1976 and 1977 or by Nicholas in 1983 or 1984.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Environmental data	Altimeter, clinometer, compass	Once
Forest & understory type	Observation	Once
Dead & downed woody material	Go-no-go gauge, ruler, tape	250 meters
Organic soil layer	Ruler	3 pits per plot
Live and dead standing stems	5-Factor Bitterlich prism	3 obs per plot

(6) Project principal investigator(s) name/present location:
N. S. Nicholas, UPFI

(7) Publications resulting from data:
In preparation.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Digital Cartography for GRSM

(2) File index category and project number: N1433-26a

(3) Period (month/year) of data collection: From: 1982 To: Present

(4) Short description: Available digital terrain tapes at 1:24,000 and 1:2500 scale were acquired for GRSM; thematic data was entered under GAGIS software at Denver Service Center. Data set being transferred to IBM-PC and Univ. Tenn.CC.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Elevation	Digital terrain tapes,	N/A
Aspect	digitizing pad	
Slope	SAGIS software	
Mapped themes	IRIS-GIS software	

(6) Project principal investigator(s) name/present location:
P. S. White, UPFI; H. Fleet, Denver Service Center

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
This will form a GIS system for use in the park.

UPFI DATA SETS

(1) Project (or data base) name: Remote sensing of GRSM vegetation

(2) File index category and project number: N1433-266

(3) Period (month/year) of data collection: From: 1982 To: Present

(4) Short description: EPA and NASA aircraft were used to acquire MSS data for the park in March and June 1982 at a 15 m pixel resolution; data are being provessed at NASA-ERL and Denver Service Center using ELAS software.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Reflectance in 12 wave length bands	Multispectral scanner	Twice (1982)
Vegetation patterns	ELAS software	N/A

(6) Project principal investigator(s) name/present location:
P. White, UPFI; M. Nyquist and G. Waggoner, Denver Service Center; C. Hill and D. Brannon, NASA

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Analysis of vegetation pattern and dynamics.
Impacts of air pollution in forest stress and change.
Habitat mapping (e.g., for gypsy moth).

UPFI DATA SETS

(1) Project (or data base) name: Analysis of GRSM Archival Records of Pre-Park Vegetation Disturbance

(2) File index category and project number: N1433-29

(3) Period (month/year) of data collection: From: 6/83 To: 12/84

(4) Short description: Collation, summary, and analysis of mappable archival information concerning pre-park disturbance of GRSM vegetation due to human activi

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Map location	Kargl Reflecting Projector	
Fires		
Buildings and cemeteries		
Disturbed areas		
Roads, trails, railroads		
Area of specific disturbance type	Planimeter Dot grid	3 replications 2 replications

(6) Project principal investigator(s) name/present location:
Charlotte Pyle, UPFI

(7) Publications resulting from data: Pyle, C. 1984. Pre-park disturbance in the spruce-fir forests of GRSM. *In* P. S. White. ed. USDI National Park Service SE Region Manage. Rep. SER-71. Pyle, W. 1985. Disturbance history of the GRSM. USDI National Park Service SE Region Manage. Rep. Series.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Additional studies and use of this study's results are discussed in Pyle 1985. The information collated on 1:24,000 scale reference maps may be seen at Uplands Laboratory.

UPFI DATA SETS

(1) Project (or data base) name: Red spruce decline

(2) File index category and project number: N1433-33a and 33b

(3) Period (month/year) of data collection: From: June 1984 To: Oct. 1985

(4) Short description: Permanent vegetation plots, assessment of crown condition; soi samples for chemical analysis, and instrument cores from 5 dominant red spruce.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Overstory (DBH & species)	20 x 20 m plot	Once
Saplings (<1.4 m tall) Density	20 2x2 m plots	"
Seedlings (<0.25 m tall) Density	20 1x1 m plots	"
Shrub Density	20 2x2 m plots	"
Shrub Cover	20 2x2 m plots	"
Herb & Ground Cover	20 1x1 m plots	"
Site Characteristic Data	Standard	"
Soil Chemistry	Standard parameters	"

(6) Project principal investigator(s) name/present location:
C. Eagar/P. White, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Remeasurement of plots will provide insight into possible red spruce mortality associated with decline and how all vegetation components are affected.

UPFI DATA SETS

(1) Project (or data base) name: Hard Mast Survey

(2) File index category and project number: N1433-32

(3) Period (month/year) of data collection: From: 1979 To: 1983

(4) Short description: Resource Management Division collected hard mast data from 1979-1982. Uplands staff conducted an observer bias survey in 1983.

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Elevation	Binoculars	8 trees per trail
DBH		
Species		
% Canopy w/seeds		
# Twigs		
# Twigs w/seeds		
# Seeds		

(6) Project principal investigator(s) name/present location:

N. S. Nicholas

(7) Publications resulting from data: Nicholas, N. S., & P. S. White. 1984. GRSM hard mast survey... USDI, National Park Service, SE Region Res./Resour. Manage. Rep. SER-68. 66 p.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Spruce-Fir Biomass Monitoring Plots

(2) File index category and project number:

(3) Period (month/year) of data collection: From: June 1984 To: Sept. 1984

(4) Short description: Biomass levels were measured and mapped on 20 permenant plots in the vicinity of Clingmans DOme road. Same plots as red spruce decline project

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Live or dead tree DBH	Tape neasyre	All per plot
Dead tree height	Clinometer	" " "
Bole volume	Tape	" " "
Twig weight	Scale	4 1x1 m per plot
Organic soil layer	Ruler, grab samples collected for chemical analysis	3 pits per plot
Environmental data	Compass, altimeter, clinometer	Once per plot

(6) Project principal investigator(s) name/present location:

N. S. Nicholas, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Plots can be used to monitor untrient cycling, decomposition rates, change in biomass levels due to hypothesized perturbation to the spruce-fir ecosystem.

II.A.2.c. Terrestrial Fauna

UPFI DATA SETS

(1) Project (or data base) name: Eastern Cougar Sightings

(2) File index category and project number: N1621

(3) Period (month/year) of data collection: From: 1908 To: 1982

(4) Short description: This data set consists of miscellaneous sightings of mountain lions in GRSM

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Cougar presence	Word of mouth	Sporadic
Cougar tracks	Cougar urine lures	57 lure days, 9/76-2/77

(6) Project principal investigator(s) name/present location:
Nicole Culbertson, whereabouts unknown

(7) Publications resulting from data:
Culbertson, N. 1977. Status and history of the mountain lion in GRSM. NPS-SERO Res./Resour. Manage. Rep. 15

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Map of cougar sightings could be developed from this data

UPFI DATA SETS

(1) Project (or data base) name: Wildlife Related Case Incidents Reports

(2) File index category and project number:

(3) Period (month/year) of data collection: From: To: Present

(4) Short description: All case incidents reports relating to resource management, such as bear incidents, hog incidents, etc., are filed in GRSM Resources Management Div.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Animal incidents	NPS case incident reports filled out by observer	As occur

(6) Project principal investigator(s) name/present location:
Resources Management Division, GRSM

(7) Publications resulting from data:
Whittaker, Paul L. 1977. Black bear management in GRSM. Rep. to the Superintendent, GRSM. 14 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Computerization of these data for specific types of incidents (already done for black bear)

UPFI DATA SETS

(1) **Project (or data base) name:** Christmas Bird Count - GRSM

(2) **File index category and project number:** N1419

(3) **Period (month/year) of data collection:** **From:** 1935 **To:** Present

(4) **Short description:** Bird species and numbers of individuals observed in 24-hr period within a predetermined 15-mile diameter circle, mostly within GRSM

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
No. of bird species and no. of individuals in each species	Field observation	Yearly

(6) **Project principal investigator(s) name/present location:**
Don DeFoe, Visitor Services Division, GRSM

(7) **Publications resulting from data:**
National Audubon Society Annual Christmas Count, published yearly in the July issue of American Birds

(8) **Opportunities for additional use of these data or proposals for additional hypotheses to be tested:**
Monitoring of bird population changes and trends

UPFI DATA SETS

(1) **Project (or data base) name:** Mammal Surveys, Collections, and Observations

(2) **File index category and project number:**

(3) **Period (month/year) of data collection:** **From:** 1931 **To:** 1977

(4) **Short description:** Survey work of various NPS and non-NPS naturalists and biologists, and assorted museum collections at GRSM and elsewhere

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Mammal populations	Surveys, observations, collections	Sporadic

(6) **Project principal investigator(s) name/present location:**
N/A

(7) **Publications resulting from data:**
Numerous; on file at GRSM; authors: Kellogg, Komarek and Komarek, Linzey and Linzey, Cody, Eiler, Fleetwood, Pfitzer, Stupka (some unpublished)

(8) **Opportunities for additional use of these data or proposals for additional hypotheses to be tested:**

UPFI DATA SETS

(1) Project (or data base) name: Diseases and Movement Ecology of White-tailed Deer in Cades Cove

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1/1/80 To: 12/30/84

(4) Short description:

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Disease prevalence	Blood sera sampled and analyzed	Intermittent
Disease vector species distribution and abundance	CO_2 insect traps; drop traps	Intermittent
Deer density	Spotlight counts; dawn and dusk counts	Intermittent
Deer movements	Radio telemetry	8/83 - 12/84

(6) Project principal investigator(s) name/present location: Greg Wathen, UPFI; John New, Dept. of Environ. Pract., Univ. Tenn.; Reid Gerhardt, Dept. Entomology and Plant Pathology, Univ. Tenn.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

Additional disease studies on sera stored at Univ. Tenn.

UPFI DATA SETS

(1) Project (or data base) name: White-Tailed Deer Population Survey

(2) File index category and project number: N1615

(3) Period (month/year) of data collection: From: 8/79 To: Present

(4) Short description: Periodic census of deer in Cades Cove

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
No. of deer	Spotlight, visual count from 6 p.m. to midnight	Monthly

(6) Project principal investigator(s) name/present location:

Bill Cook, Resources Management Div., GRSM

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Bat Counts

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1979 To: Present

(4) Short description: Count of hibernating bats in GRSM caves

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
No. of bats	Visual counts, estimate of total numbers	Biennially

(6) Project principal investigator(s) name/present location:
Stu Coleman, Resources Management Division, Great Smoky Mountains National Park
Bob Curry, US Fish and Wildlife Service, Asheville, NC

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Animal Sightings and Wildlife Reports

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1931 To: 1971

(4) Short description: Yearly (1931-1953) tabulation of animal sightings in GRSM. Sporadic after 1953.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Animal sightings	Tabulation	Annually

(6) Project principal investigator(s) name/present location:

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Salamander Catalogue

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1980 To: 1980

(4) Short description: Catalogue of all information available on salamanders in GRSM as of 1980

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Information on salamanders by genus and species: habitat, feeding, behavior, disease, predation, coloration, distribution, ecology	Library research	Once per reference

(6) Project principal investigator(s) name/present location:
Charlotte Pyle, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Rooting Index Project - 1983

(2) File index category and project number: N1422-23

(3) Period (month/year) of data collection: From: 6/83 To: 8/83

(4) Short description: Determined the distribution of wild hog rooting during the summer season, evaluated the ecological relationships of the rooting, and developed an extent of rooting index/monitoring system to be implemented on a parkwide basis

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Hog rooting	20-m wide strips along trails and cross-country routes +	Once
Plant community type	subjective	"
Slope	clinometer	"
Aspect	compass	"
Elevation	altimeter	"
Terrain features	maps	"

(6) Project principal investigator(s) name/present location:
Christopher Eagar, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Reduction Summary

(2) File index category and project number:
(3) Period (month/year) of data collection: From: 1959 To: 1977

(4) Short description: N/A

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Date Subdistrict Weight Sex Reduction method	Observation and estimation	By incident

(6) Project principal investigator(s) name/present location:
Frank Singer, NPS, Anchorage, AK

(7) Publications resulting from data:

(8) Opportunities for additional use of thise data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Subterranean Sampling in Hog Rooted Areas

(2) File index category and project number:
(3) Period (month/year) of data collection: From: 1978 To: 1979

(4) Short description: Comparison of tubers and invertebrates in hog-rooted areas

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Tuber presence Dry weight Volume Invertebrate presence Number Volume		

(6) Project principal investigator(s) name/present location:
Tom Howe, 514 Clark St., Maryville, TN 37801
Frank Singer, NPS, Anchorage, AK

(7) Publications resulting from data:
Howe et al. 1981. J. Wildlife Manage. 45(3):748-754

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Hog Carcass Disposal

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 11/75 To: 4/76

(4) Short description: Project designed to determine amount of time necessary for hogs to decompose

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Carcass odor,	Observation, measurement,	Every 3 days
weather, forest type,	and estimation	"
understory type,		"
human and/or animal		"
sign, distance to		"
stream, percent		"
decomposition,		"
location, and date		"

(6) Project principal investigator(s) name/present location:
Susan Bratton, NPS-CPSU, Institute of Ecology, Univ. of Georgia, Athens

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Behavior of European Wild Hogs

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 6/76 To: 9/76

(4) Short description: Study of hog behavior and estimate of European wild boar population densities and sex ratios

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Hog presence, age class, sex, population, estimates; behavior: feeding times, use of trails, interactions, family grouping	Census, by direct observation and hikers' observations	By incident

(6) Project principal investigator(s) name/present location:
Mark Shaffer, Duke University School of Forestry and Environmental Studies, Durham, NC

(7) Publications resulting from data:
Shaffer, M. L. 1976. Behavior of European Wild Boar in GRSM. Unpublished manuscript

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
N/A

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Stomach Analysis - Preliminary

(2) File index category and project number:
(3) Period (month/year) of data collection: From: 1975 To: 1976

(4) Short description: Analysis of stomach contents of wild hogs killed in GRSM, 1975-1976

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Volume and qualitative determination of stomach contents	Measuring flask, dissecting scope	

(6) Project principal investigator(s) name/present location:
Frank Singer, NPS, Anchorage, Alaska

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Stomach Analysis, 1977-1978

(2) File index category and project number:
(3) Period (month/year) of data collection: From: 1977 To: 1978

(4) Short description: Detailed analysis of stomach contents of wild hogs killed in GRSM

(5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Stomach contents % of total volume of each food type	Dissecting scope Measured in ml (as water)	

(6) Project principal investigator(s) name/present location:
Tom Howe, 514 Clark St., Maryville, TN 37801
Frank Singer, NPS, Anchorage, Alaska

(7) Publications resulting from data:
Howe et al. 1981. J. Wildlife Manage. 45(3):748-754; Ackerman et al. 1978. Rep. to Superintendent, GRSM, pp. 93-137.

(8) Opportunities for additional use of this data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: European Wild Hog Population Determination

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1977 To: 1977

(4) Short description: Various population census records and tabulations

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Location, date, time, elevation, vegetation type, slope, exposure, no. of boar, identifying marks	Observation, measurement, and estimation	Per incident

(6) Project principal investigator(s) name/present location:
Frank Singer, NPS, Anchorage, Alaska

(7) Publications resulting from data:
Singer et al. 1978. Report to Superintendent, GRSM, pp. 1-92
Singer and B. Ackerman. 1981. NPS-SERO Res./Resour. Manage. Rep. 43. 52 pp.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Wild Hog Radiotelemetry

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 2/1977 To: 1979

(4) Short description: Maps; data sheets on radio signals received from collared hogs; forest type data sheets

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Receiving point	Radio signal	Sporadic
Weather	Declination, field observations	"
Time		"
Diel activities		Hourly for 24 hrs
Forest type		Once

(6) Project principal investigator(s) name/present location:
Alan Tipton, Dale Otto, whereabouts unknown
Frank Singer, NPS, Anchorage, Alaska

(7) Publications resulting from data:
Tipton and Otto. 1979. Evaluating wild boar movement activity and distribution in GRSM. Unpubl. manuscript.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Hog Sightings and Animal Collection Reports

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 10/74 To: 4/76

(4) Short description: Data collected in field on hogs at time of sighting or kill. Description of hog, location, and organs collected.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Age, sex, weight size, reproductive status	Observation, measurement, and estimation	By incident
Location, type of sighting, parts collected	Observation and description	"

(6) Project principal investigator(s) name/present location:
Frank Singer, NPS, Anchorage, AK

(7) Publications resulting from data:
Singer et al. 1978. Report for the Superintendent, GRSM. Appendix, Part I, pp. 40-42

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: European Wild Hog Baiting and Eradication Studies

(2) File index category and project number:

(3) Period (month/year) of data collection: From: June 1984 To: Present

(4) Short description: Study to determine bait and attractant preferences of wild hogs. Information is to be used to develop bait(s) for trapping wild hogs.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Attractant/bait preferences	Variety of ethological methods	

(6) Project principal investigator(s) name/present location: Rick Noseworthy and Greg Wathen, UPFI; Jim Jensen, Dept. of Environ. Practice, College of Veterinary Medicine, Univ. of Tennessee.

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Data may be useful to other NPS areas or other agencies that are actively involved in wild hog control.

UPFI DATA SETS

1) Project (or data base) name: Hog Rooting Damage Index - 1984

2) File index category and project number:

3) Period (month/year) of data collection: From: June 1984 To: Oct. 1984

4) Short description: Determine the extent of hog rooting damage along index routes.

5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Hog rooting	20-meter-wide strip along trails (10 m/side)	Once
Elevation	Elevation of rooting	"
Topographic position	Ridge, slope, or draw	"

6) Project principal investigator(s) name/present location: J. Peine/D. Madl and C. Eagar, UPFI

7) Publications resulting from data: NPS SE Region Res./Resour. Manage. Report. Data and results combined with Hog Rooting - 1983 Study.

8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: First year of a long-term study. Additional years will provide a valuable data set to evaluate rooting damage.

UPFI DATA SETS

1) Project (or data base) name: Avifauna Diversity/Density at Special Protection Sites - Monitoring

2) File index category and project number:

3) Period (month/year) of data collection: From: April To: July - Annual
Started in 1984

4) Short description: Paired transects established in each area to establish baseline and monitor changes that may occur resulting from special protection febcubg,

5)

(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Avian richness Avian density	Transects - Refined Emlen system	8-10 readings on each annually

6) Project principal investigator(s) name/present location:
Coordinator: Ro Wauer, GRSM

7) Publications resulting from data:
No reports to date - First report on baseline in summer 1985

8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: For use as long-term monitoring of various units; results can be incorporated into multivariate analysis of units for stability and early warning system.

II. A.3. Sociological Studies

UPFI DATA SETS

(1) Project (or data base) name: Amusement Recreation Marketing Services, Inc., Survey

(2) File index category and project number: N46

(3) Period (month/year) of data collection: From: 1974 To: 1975

(4) Short description: An extensive survey of visitors and nonvisitors to GRSM covering numerous aspects of their visit and reasons for nonvisitation

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Sociodemographics	Questionnaire	Once/subject
Travel patterns	"	"
Use patterns	"	"
Expenditures	"	"
Media use	"	"

(6) Project principal investigator(s) name/present location:
Amusement Recreation Marketing Services, Inc. No longer in existence

(7) Publications resulting from data:
Numerous reports generated from this project; most are on file at UPFI. Actual data set is probably unavailable.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Backcountry Attitudinal Survey

(2) File index category and project number: N4615-02

(3) Period (month/year) of data collection: From: 6/83 To: 9/83

(4) Short description: Identifies attitudes of backcountry visitors toward current park management practices, describes backcountry users in terms of use patterns, experience level, and wilderness expectations

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Backcountry users experience levels	Questionnaire/observation	Once/user
Backcountry attitudes toward management practices	"	"
Backcountry expectations	"	"

(6) Project principal investigator(s) name/present location:
John Burde, Kevin Curran, Southern Illinois Univ.; John Peine, UPFI

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Social Interaction with Backcountry Bears

(2) File index category and project number: N4615-03
(3) Period (month/year) of data collection: From: To:

(4) Short description: Measured backcountry users attitudes, knowledge, and behavior toward backcountry bears

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Knowledge of bears	Questionnaire	Once/visitor
Attitudes about bears and other wildlife	"	"
Behavior around bears	"	"

(6) Project principal investigator(s) name/present location:
Pam Petko-Seus, Univ. of Tennessee

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Mountain Press Visitor Study

(2) File index category and project number: N46
(3) Period (month/year) of data collection: From: 7/83 To: 7/83

(4) Short description: Collected sociodemographic data and determined information needs and resources used by visitors to GRSM and area towns

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Sociodemographic information	Questionnaire	Once/visitor
Use patterns	"	"
Travel patterns	"	"
Activities	"	"
Media use	"	"

(6) Project principal investigator(s) name/present location:
Harte-Hanks Communications, Inc., San Antonio, TX

(7) Publications resulting from data: Mountain Press Visitor Study

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: GRSM Communication Study

(2) File index category and project number: N4615-01

(3) Period (month/year) of data collection: From: 6/83 To: 9/83

(4) Short description: Visitor survey to determine awareness of, utilization of, and preferences for certain information media in GRSM. Also tested old and new message designs of radio and bulletin board for effectiveness. Media surveyed were park newspaper, park 1610 AM shortrange radio, bulletin board, and touch screen computer.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Visit characteristics	Oral questionnaire	Once/visitor
Sociodemographics	"	"
Information preferences	"	"
Media awareness	"	"
Media use	"	"
Media use	Unobtrusive observation	"
Media-specific info.	Oral questionnaire	

(6) Project principal investigator(s) name/present location:
John Peine, Craig Walker, Paul Motts, UPFI; Bill Hammitt, Univ. of Tennessee

(7) Publications resulting from data:
Peine et al. Media effectiveness in GRSM. In preparation.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
Media content could be adjusted based on visitor preference findings. Media that are emphasized by management need to be evaluated in light of awareness findings.

UPFI DATA SETS

(1) Project (or data base) name: Sugarlands Visitor Center Visitor Use Study

(2) File index category and project number: N46

(3) Period (month/year) of data collection: From: Spring 1982 To: Spring 1983

(4) Short description: Surveyed users of Sugarlands Visitor Center to determine effectiveness of exhibits

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Visitor response to exhibits in Sugarlands Visitor Center	Questionnaire	
Visitor sociodemographs	"	
Visit characteristics	"	

(6) Project principal investigator(s) name/present location:
Geoffrey Hayward, Univ. of Massachusetts

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested: Baseline data to compare with new exhibits installed 6/84.

UPFI DATA SETS

(1) Project (or data base) name: Visual Preference of Trail Users

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 7/81 To: 8/81

(4) Short description: On-site study of the visual preferences of visitors to Trilliam Gap Trail. Used visual/photo questionnaire.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Landscape scenes	Mail questionnaire	Once
Socio-economics		
Experience level		

(6) Project principal investigator(s) name/present location:

William E. Hammitt and Brian Keyes, University of Tennessee

(7) Publications resulting from data:
Numerous.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:
More analysis is possible.

UPFI DATA SETS

(1) Project (or data base) name: Visitor Perception of Wildlife Resources in Cades Cove

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 6/83 To: 8/83

(4) Short description: Study of visitor knowledge and perception of wildlife resources in Cades Cove, GRSM.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Visitor preferences	Mail questionnaire	
Visitor knowledge		
Socio-economic		
Management Issues		

(6) Project principal investigator(s) name/present location:

William E. Hammitt and Bruce Hastings, University of Tennessee

(7) Publications resulting from data:

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Stream Floaters of So. Appalachian Rivers

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 6/78 To: 9/78

(4) Short description: Three Rivers were studied, one being Deep Creek in GRSM. Studied the preferences, characteristics, use patterns, and management preferences of innertube floaters.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
User preferences	Mail questionnaire	Once
User characteristics		
Management issues		
River impacts		
Use patterns		

(6) Project principal investigator(s) name/present location:

William E. Hammitt and Cary D. McDonald, University of Tennessee

(7) Publications resulting from data:
Numerous

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

UPFI DATA SETS

(1) Project (or data base) name: Winter Backcountry Use, GRSM

(2) File index category and project number:

(3) Period (month/year) of data collection: From: 1979 To: 1980

(4) Short description: Study of user characteristics and patterns of use of winter backcountry users.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Use patterns	Backcountry permits	Once
User characteristics	Mail questionnaire	
Experience levels		

(6) Project principal investigator(s) name/present location:
William E. Hammitt and Janet Loy Hughes, University of Tennessee

(7) Publications resulting from data: Hammitt, W. E. & J. L. Hughes. Characteristics of winter
Backcountry use in GRSM. Environ. Manage. 8(2):161-166. Hammitt, W. E. & J. L. Loy. 1980. Behavior
of winter backcountry users in GRSM. *In* Proc. Social Science in National Parks and Wildland Areas.
Great Smoky Mountains National Park, Gatlinburg, TN. pp.11-21.

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

More analysis of the data is possible.

(1) Project (or data base) name: Computerized Records of Incident Reporting System

(2) File index category and project number: Filed by code number and incident number

(3) Period (month/year) of data collection: From: 1982 To: Present

(4) Short description: Data base containing incident reports in the following categories.

(5)(a) Parameters measured	(b) Equipment/procedures used	(c) Frequency of measurement
Resources management	Case incident report form	Per incident
Visitor use	" " " "	
Traffic violations	" " " "	
Commercial activities	" " " "	
Services	" " " "	
Search and rescue	" " " "	

(6) Project principal investigator(s) name/present location:
Ron Click, Communications Office, GRSM

(7) Publications resulting from data: N/A

(8) Opportunities for additional use of these data or proposals for additional hypotheses to be tested:

II.B. SUMMARY OF BASELINE DATA COLLECTED TO DATE BY WATERSHED, WITH DESCRIPTIONS OF EACH WATERSHED IN THE PARK

INTRODUCTION

The following set of tables summarizes selected research and monitoring work in GRSM by watershed. It is intended to be a quick reference guide and to inform the reader of research and monitoring efforts in each of the 28 watersheds in the park.

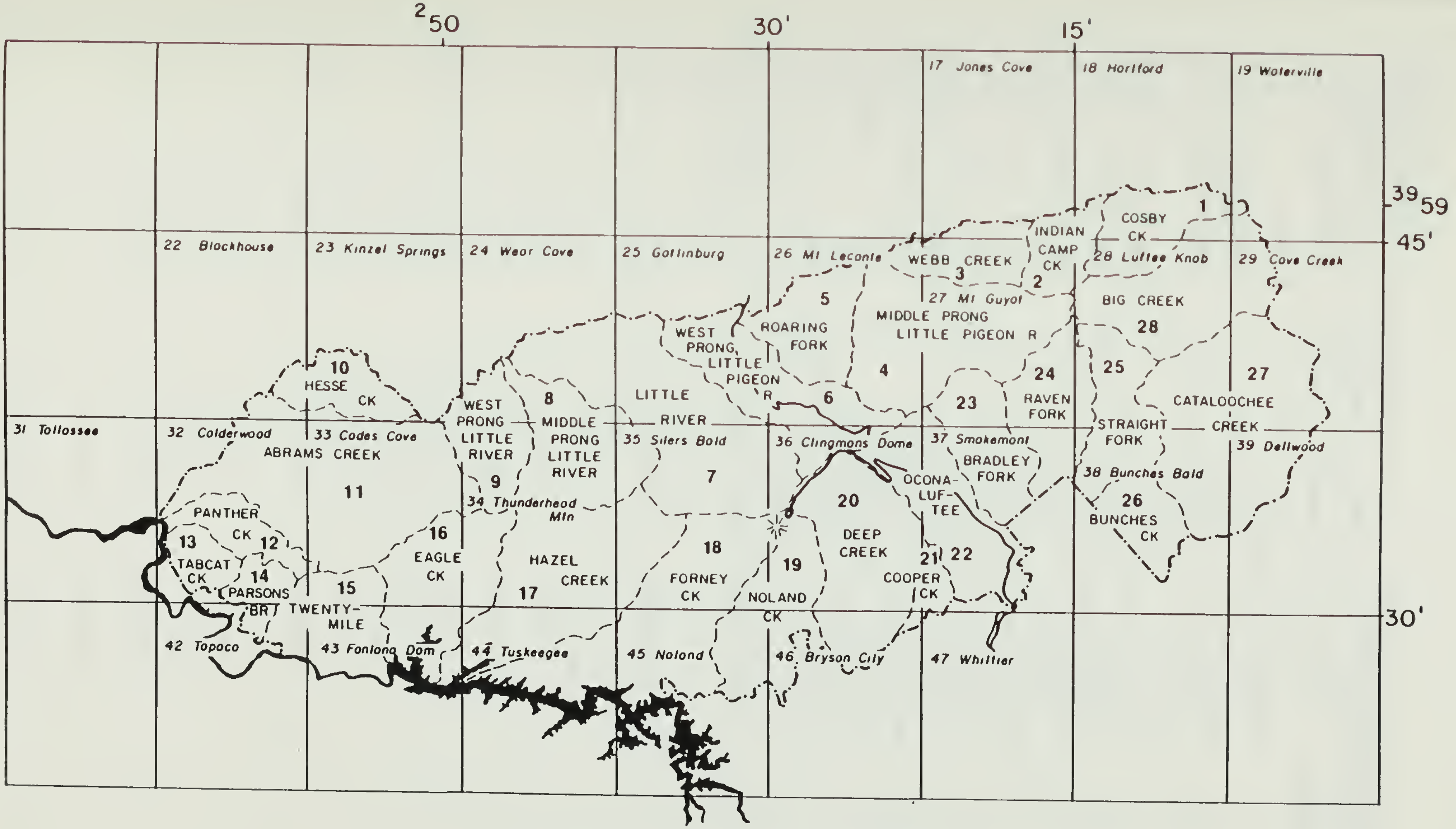
Table 1 gives the name, numeric code, minimum and maximum elevation, and predominant aspects for each watershed. This is followed by Map I, which shows the location of each watershed. The watershed numbers used in Table 1 and Map I are used throughout this section. Table 2 lists the names of major streams in the park, the watershed in which each is located, maximum and minimum elevations as indicated by blue lines on USGS topographic maps, and UTM coordinates. Map II shows the locations of the major stream systems in the park.

Tables 3 to 6 outline the geology, logging history, and travel time from Uplnds Field Research Laboratory (UPFI), Gatlinburg, Tennessee as well as accessibility within each watershed. Following these are Tables 7 to 14, giving monitoring station and research project locations.

The section ends with a summary table (Table 15) which includes a subjective general description of each watershed as "minimally disturbed," "moderately disturbed," or "extensively disturbed." Each watershed is placed in an "overall access class," and the number of monitoring programs, both historical and present, is given for each watershed.

Table 1. Great Smoky Mountains National Park Watersheds.

Water-shed No.	Water-shed Name	Elevation				
		Min. Feet	Min. Meters	Max. Feet	Max. Meters	Predom. Aspects
1	Cosby	1650	503	5920	1804	N
2	Indian Camp	2120	646	6356	1937	N
3	Webb	1400	427	5260	1603	N
4	Little Pigeon	1360	415	6621	2018	N,W
5	Roaring Fork	1550	472	6593	2010	N,NW
6	West Prong	1340	408	6593	2010	N,W
7	Little River	1150	351	6643	2025	N,W
8	Middle Prong	1100	335	5527	1685	N,W
9	West Prong	1150	351	5527	1685	N,W
10	Hesse	1120	341	3686	1123	N,NW
11	Abrams	874	266	5070	1545	N,NW
12	Panther	874	266	4949	1508	S,SW
13	Tabcat	874	266	2767	843	S,SW
14	Parsons	1350	411	4732	1442	S,W
15	20-Mile	1276	389	4949	1508	S
16	Eagle Cr	1708	521	5527	1685	S
17	Hazel Cr	1708	521	5607	1709	S,W
18	Forney Cr	1708	521	6643	2025	S
19	Noland Cr	1708	521	6643	2025	S
20	Deep Creek	1760	536	6300	1920	S
21	Cooper CR	2560	780	5160	1573	E,S
22	Oconaluftee	1960	597	6217	1895	S,E
23	Bradley	2200	671	5907	1800	S
24	Raven	2700	823	6417	1956	S
25	Straight	2560	780	6234	1900	S
26	Bunches Creek	2800	853	5970	1820	S,W
27	Cataloochee	2300	701	6155	1876	N,E
28	Big Cr	1550	472	6621	2018	N,E



MAJOR WATERSHEDS AND 7.5' USGS QUADRANGLE MAPS

GREAT SMOKY MOUNTAINS NATIONAL PARK

0 5 10
MILES

0 5 10
KILOMETERS

--- Major watershed boundaries

Table 2. Index to Main Drainages in GRSM

Location	Watershed	Elevation	UTM Coordinates-Km N	UTM Coordinates-Km E
Abrams Creek	11	840-2200	3938.5-3944	228-250
Anthony Creek	11	1900-4800	3939-3943.5	248.3-252.5
Baxter Br. = Baxter Cr.	28	1720-4380	3955.25-3959.75	309-309.25
Beard Cane Cr.	10	1100-1740	3947.5-3951	240-238.5
Big Br.	28	1680-3040	3957.75-3959.75	309.5-310
Big Cr.	19,28	1600-3000	3955.5-3960	304.5-309
Bone Valley Cr.	17	2500-3960	3934.5-3945	256.5-267.75
Bradley Fork	23	2200-2760	3942.5-3937.5	289.5-290.5
Caldwell Fork	27	2640-4500	3937.5-3945	305-311
Cane Cr.	10	1300-1680	3948-3951	237-239
Cataloochee Cr.	27	2400-2800	3945-3958	308
Cosby Cr.	1	2440-4400	3957.5-3958	300-302
Cove Cr.	27	2550-3800	3944.3-3946.6	312.1-314.6
Deep Cr.	20	1800-5000	3927-3944	278.5-278
Eagle Cr.	16	1700-2400	3927-3935.5	247-250.25
Fighting Cr.	6	1440-3600	3953-3953	266-270
Forge Cr.	11	1740-3440	3936-3942	242-242
Forney Cr.	18	1800-3200	3925-3934	267-269
Hazel Cr.	17	1600-5000	3926-3939	249-266
Indian Cr.	20	2000-4200	3928-3936	279-284
Jonas Cr.	18	2400-4800	3933-3939	268-276
Laurel Cr.	9	1600-1880	3944-3948	250-254
LeConte Cr.	5	1600-5400	3949-3954	272-278
Little River	7	1200-5200	3951-3960	243-254
Little Pigeon River	4	1400-2800	3953-3958	281-289
Meadow Branch	9	1280-2080	3948-3949	251-254
Middle Prong	4	2080-2240	3955-3954	285-287
Middle Prong, Little River	8	1160-2200	3944-3951	253-254
Mill Cr., Blount Co.	11	1720-3920	3939-3943	241-248
Mill Cr., Swain Co.	19	2400-4400	3931-3935	273-274

Table 2 (cont.)

Location	Watershed	Elevation	UTM Coordinates-Km N	UTM Coordinates Km E
Noland Cr.	19	1720-4600	3925-3937	270-275
Moore Springs	15	1580-4660	3929-3935	239-240
Panther Cr.	12	980-4400	3935-3939	229-239
Parsons Br.	14	1200-2600	3932-3937	233-236
Pretty Hollow Cr.	27	3000-4920	3946-3951	306-307
Oconaluftee	22	2000-2800	3932-3941	285-291
Rabbit Cr.	11	1400-2600	3937-3944	237-238
Raven Fork	24	2800-4200	3941-3947	294-295
Roaring Fork	5	1600-4600	3949-3955	275-279
Rough Fork	27	2840-3840	3942-3944	304-308
Straight Fork	25	2440-4200	3938-3950	296-298
Tabcat Cr.	13	920-1680	3936-3937	228-232
Twenty Mile Cr.	15	1400-3800	3929-3935	228-232
West Prong, Little Pigeon River	6	1120-1400	3955-3955	271-284

MAP 11: MAJOR STREAM SYSTEMS IN GRSM

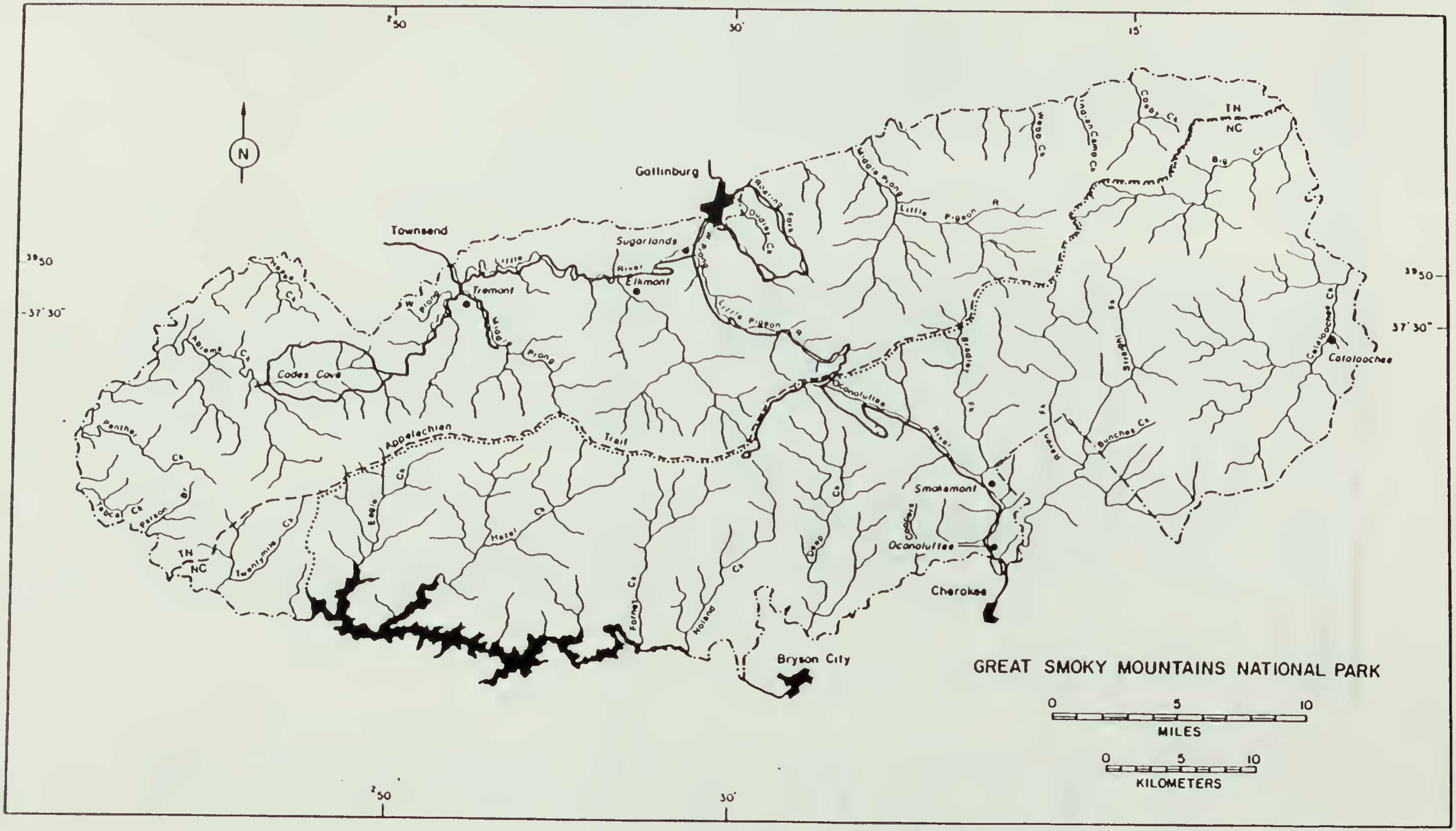


Table 3. Geologic groups in GRSM.

Watershed	Knox	Basement	Walden Creek	Thunderhead Sandstone		Snow-bird
				Non-Anakeesta	Anakeesta	
1				X		X
2				X		X
3				X		X
4				X	X	X
5			X	X	X	X
6				X	X	X
7				X	X	X
8				X	X	X
9						X
10			X			X
11	X		X	X		X
12			X	X		
13			X			
14				X		
15				?		
16				?		
17				?		
18				?		
19				X		
20		X		X	X	
21		X		X	X	
22		X		X	X	X
23		X		X	X	
24		X		X		X
25		X		X		X
26				X		
27		X		X		X
28				X		X

(1) Watershed No. 6 is affected by landslide and natural stream exposures of Anakeesta formation. Watersheds Nos. 17, 19, and 22 are affected by roadcut exposures of Anakeesta formation. Watershed No. 19 is affected by orphan copper mines (deep mines) at low elevation.

(2) Soil studies have been done in every watershed in the park, and county assessments are kept at Park Headquarters. These are general and not definitive enough to categorize in this scheme.

Table 4. General summary of disturbance history by watershed in GRSM.

Watershed	Unlogged	Light Cut: Low impact removal of certain spp. or patches of clear cutting dispersed throughout watershed	Extensive Logging: Use of railroad, mostly clearcut	Few Fires: Mostly small and on south slopes and ridges	Major Fires: Large areas burned with erosion-High elevation fires	Homesteaded farming in lowlands - limited tree removal
1	X			X		X
2	X			X		X
3		X				X
4		X		X		X
5		X				X
6		X				X
7			X		X	
8			X		X	
9			X	X		
10		X		X		
11		X		X		X
12	X			X		
13		X		X		
14	X			X		
15		X				
16			X	X		
17			X		X	
18			X		X	
19		X		X		
20		X				X
21		X				X
22			X			
23			X (lower half only)		X	
24	X					
25			X			
26			X X			X
27			X*		X*	
28			X		X	

*High elevation only

Table 5. Travel time from UPFI to GRSM watersheds.

Watershed	Travel Class*	
	Low	High
1	1	2
2	1	3
3	1	3
4	1	2 to 4
5	1	2 to 4
6	1	1
7	1	1 to 2
8	1	3
9	1	3
10	2	3
11	1 to 2	2 to 3
12	2	2
13	2	2
14	2 to 3	2
15	3	3
16	4	3
17	4	4
18	2 to 3	1 to 2
19	2	1
20	1 to 2	1
21	2	2
22	1	1
23	1	2 to 4
24	2 to 3	4
25	2	4
26	2	2
27	3	4
28	2	3 to 4

*Low = low elevation; High = high elevation

Description of codes (time for entry into watershed - not time hiking within watershed):

1 = 1 to 2 hrs driving/hiking time (one way)
2 = 2 to 4 hrs driving/hiking time (one way)
3 = 4 to 6 hrs driving/hiking time (one way)
4 = One-day trip (one way)

Table 6. Accessibility within watersheds of GRSM.

Watershed	Public Road		Administrative Road*		Foot Trail**		Water***
	Low	High	Low	High	Low	High	
1	G	N	G	N	G	G	
2	P	N	G	N	G	G	
3	N	N	N	N	N	N	
4	N	N	F	N	F	P	
5	G	N	?	N	G	G	
6	E	E	F	N	G	G	
7	E	F	G	N	G	F	
8	E	N	?	N	F	F	
9	E	N	N(?)	N	G	F	
10	P	P	N	N	P	P	
11	E	P	P	N	F	F	
12	P	F	N	N	N	P	
13	P	N	N	N	N	N	
14	G	G	N	N	N	P	
15	P	N	?	N	G	G	
16	N	N	N	N	G	G	Boat
17	N	N	N	N	G	G	Boat
18	N	P	N	N	G	G	Boat
19	P	F	N	F	G	G	
20	G	E	?	N	G	F	
21	N	N	?	N	G	F	
22	E	E	P	N	F	G	
23	P	N	P	N	G	F	
24	N	N	N	N	F	P	
25	G	N	N	N	P	P	
26	N	G	N	?	N	P	
27	F	P	?	N	G	G	
28	P	N	N(?)	N	G	G	

*Official permission required for use.

**Horses can be used on many of these trails, but there is no complete guide as to which trails are approved for horse usage. Check with Resources Management Division or appropriate Sub-District Rangers for specific information.

***Water refers to access via Fontana Lake to lower portion of watershed.

Low = Low elevation
High = High elevation

N = None: None of this type
P = Poor: Poor system of this type
F = Fair
G = Good
E = Excellent

Table 7. Weather Monitoring Stations in GRSM watersheds.*

Watershed	General	Fire Weather	Remote	Solar Radiation	Fog Interception	Precip.
5	0		0	0		
6	+					+
7		+	0	0		
11	+	+	0			
15	+					
19			0		+	
21						
22	+	+				+
26						
27	+					+

* + = present; 0 = historical

Table 8. Air Pollution Monitoring Stations in GRSM watersheds*.

Watershed	SO_2†	NO_x†	O_3†	Hydrocarbons	Visibility	TSP†	Fine particulates	Aerosols	Dicot. part.†	Total sulfur
5	0		0							
7	0		#	0		0		0	0	
11	+	+	+	+	+	+	+		0	0
19			#							

* + = present; 0 = historical; # = planned

† SO_2 = Sulfur dioxide; NO_x = nitrous oxides; O_3 = ozone; TSP = total suspended particulates; dicot. part. = dichotomous particulates

Table 9. Atmospheric Deposition Monitoring Stations in GRSM watersheds

Watershed	NADP	UPFI Parkwide	TVA-Elevational	Bulk Collector	Throughfall
1		X			X
7	X	X			
16		X			
19		X			X
22		X			
23			X		X
27		X		X	

NOTES:

(1) The TVA atmospheric deposition collector at Elkmont (Watershed No. 7) was moved to Cataloochee on 10/82, and the bulk collector at Cataloochee was therefore discontinued. The NADP collector remains at Elkmont.

(2) Noland Creek watershed (No. 19) is considered inclusive of the TVA atmospheric deposition collector and throughfall collector at Clingmans Dome, through the high elevation zones where numerous watersheds come together make this designation very ambiguous.

(3) Eagle Creek watershed (No. 16) is inclusive of the Fontana Dam site of one of the atmospheric deposition collectors.

(4) Oconaluftee River watershed (No. 22) includes the Smokemont campground site of one of the TVA atmospheric deposition collectors.

Table 10. Stream and Groundwater Monitoring Stations in GRSM watersheds (+ = present; 0 = historical; # = planned)

WATER-SHED	Stream Stage Height	Flood Warning	Water Quality	TVA Sequential Stream Coll.	TVA Bio-assay Lab	Uplands Bioassay Lab	Uplands Observa-tion Tank	Observation Well	Lysimeter
1	0		0						
2									
3									
4									
5	0		0						
6	+	+				+	+		
7	0		0						
8								+	0
9									
10									
11			+						
12									
13									
14									
15									
16									
17									
18									
19	0		0						
20	+	+							#
21									
22	+	+							
23									
24	+	+		0	0				
25	+		+						+
26									+
27	+		+						
28									0

NOTE:

Watersheds Nos. 16, 17, and 18 affected through inundation of lower elevations by Fontana Reservoir.

Table 11. Atmospheric Deposition Related Ecological Research in GRSM watersheds*.

Watershed	Litter metal accum.	Fl. Accum.	Lichen Survey	FORAST	Pb. accum. (Soil, litter, leaves	Heavy metal sediment core
5	0		0			
6				0		
7	0		0		0	
8	0				0	
11		+		0		0
16						0
17						0
18						0
22	0		0		0	
23			0			
24			0			

* + = present; 0 = historical

NOTE:

Sediment cores for analysis of heavy metals were taken in Gum Swamp at Cades Cove (Watershed No. 11). Superficial sediments were taken via Ponar Grab in the inundated lower reaches (by Fontana Lake) of watersheds nos. 16, 17, and 18). These superficial sediments were maintly concerned with metals from Anakeesta leaches, but analyses also include contributions that may have come from atmospheric deposition.

Table 12. Vegetation mapping and survey plots in GRSM watersheds.

Watershed	Plots	Aerial Photo Interp.	Rare and Endangered*
1	Limited	Spruce fir only	C.S., O.S.
2	Limited	"	C.S., O.S.
3		"	O,S.
4	Limited	"	X C.S., O.S.
5	Limited	"	X C.S., O.S.
6	Limited	"	X C.S., O.S.
7		"	C.S., O.S.
8		Limited	
9			
10	Limited		O.S.
11	X	Limited	X O.S.
12	X		O.S.
13	X		
14	X		
15			
16			C.S.
17		Spruce fir only	C.S.
18		"	X C.S
19		"	X C.S., O.S.
20		"	C.S.
21		"	C.S.
22		"	C.S.
23		"	C.S.
24		X	C.S.
25		Spruce fir only	C.S.
26		"	C.S.
27		"	X C.S.
28		"	C.S.

*C.S. = Cacalia study
O.S. = Orchid survey
X = Major activity which was site specific. Broader surveys are also shown: Cacalia study;orchid survey.

Every activity (e.g. rare plant field work) was not shown- for example, some rare plant work has taken place in every watershed.

NOTE:
A new vegetation map covering all 28 GRSM watersheds is scheduled for completion in 1985.

Table 13. Fishery surveys in GRSM watersheds.

Watershed	Trout Inventory	Brook Trout Recovery Program	Low Elev. Big Stream Survey	Trout Tissue Heavy Metal Accumulation	Experimental Fishery Studies	Envir. Impact Related Studies	Fish Inventory
1	X						X
2	X						
3	X						
4	X	X			X		X
5	X						
6	X	X	X	X			X
7	X		X				X
8	X						X
9	X						
10	X						
11	X					X	X
12	X						X
13	X						X
14	X						X
15	X						X
16	X						
17	X						X
18	X	X					X
19	X						X
20	X		X				X
21	X						
22	X		X				
23	X						
24	X		X				X
25	X						
26	X						
27	X						
28	X						X

Table 14. Vertebrate studies (other than fishery surveys) in GRSM watersheds.

	Vertebrate Studies							
Watershed	Skunk	Fox	Indiana Bat	Red-Cockaded Woodpecker	Salamanders	Bear	White-Tailed Deer	Hog
1					X	X		X
2					X	X		X
3					X	X		X
4					X	X		X
5					X	X		X
6					X	X		X
7			X		X	X		X
8					X	X		X
9					X	X		X
10					X	X		X
11	X	X			X	X	X	X
12					X	X		X
13				X	X	X		X
14					X	X		X
15					X	X		X
16					X	X		X
17					X	X		X
18					X	X		X
19					X	X		X
20					X	X		X
21					X	X		X
22					X	X		X
23					X	X		X
24					X	X		X
25					X	X		X
26					X	X		X
27					X	X		X
28					X	X		X

Table 15. Summary of watershed characteristics in GRSM.

Watershed	Disturbance Class	Overall Access Class	Monitoring Programs	Research Projects
1	Mo	G	5	8
2	Mo	G		7
3	Mo	P		6
4	Mo	F		10
5	Mo	G	9	9
6	Mo	G	4	12
7	E	G	14	12
8	E	F		8
9	E	F		4
10	Mo	P		6
11	E	F	13	15
12	Mi	P		7
13	Mi	P		7
14	Mi	P		6
15	Mo	F	1	5
16	E	F	1	6
17	E	F		8
18	E	F		9
19	Mo	F	7	7
20	Mo	F	3	8
21	E	P		6
22	E	G	6	10
23	E	F		7
24	Mi	P	7	9
25	E	P	3	6
26	E	P		6
27	E	F	7	6
28	E	F		7

Disturbance Class: Summarizes Table 4:

Mi = Minimally disturbed - includes unlogged watersheds with few or no fires, without homstead farming, no roadcuts through Anakeesta formation, and no inundation of lower reaches by Fontana Reservoir.

Mo = Moderately disturbed - includes selective logging practice. natural exposures of Anakeesta formation, few fires in historical records, and homestead farming. Watershed No. 19 is affected by roadcut exposures of Anakeesta formation but the ecological damage is considered moderate, so it is included in this category.

Table 15. (cont.)

	E = Extensively disturbed - includes extensive logging history, major fires, homestead farming, roadcut Anakeesta exposures, and inundation by Fontana Reservoir of lower sections. Watershed No. 11 is included in this category mainly due to historical management using cattle at Cades Cove, stream channelization and fish toxicant removal practices, and inundation of lower reaches by Chilhowee Reservoir.
Overall Access Class:	Summarizes Tables 5 and 6. Based upon designation in access tables for area within each watershed and travel time to watershed from UPFI. Class codes are somewhat general. The above-mentioned tables should be looked at for more definitive designation. G = good, F = fair, P = poor.
Monitoring Programs:	Summarizes Tables 7-10. Denotes the total number of monitoring programs in each watershed. Includes only historical and present programs.
Research Projects	Summarizes Tables 11-14. Denotes the total number of research projects in each watershed. Includes only historical and present projects.

III. FUTURE RESEARCH NEEDS IN GREAT SMOKY MOUNTAINS NATIONAL PARK

This is perhaps the most important section in this report in terms of conveying to researchers in other government agencies and universities the need for cooperation in solving the many and varied natural resource and environmental problems in GRSM. What follows is a far from complete list of ideas for future research in the park. The list includes research ideas that are directly related to natural resources management problems as well as ideas that are more attuned to the gathering and scientific analysis of data that will add to our basic knowledge of natural ecosystems, often a crucial first step in the solution of complex management-related problems. Items listed here go beyond the research priorities documented in the GRSM Resources Management Plan. Projects identified in that document are considered essential to the implementation of the plan and will probably be addressed by the National Park Service. This list will most certainly grow and the need for better understanding of GRSM ecosystems will continue to mushroom. In the meantime, it is essential that we continue to focus our attention on the problems at hand in order to better facilitate the preservation of the Great Smoky Mountains ecosystems.

III.A. Aquatic Ecosystems

Surveys

1. Qualitative survey of selected streams within those watersheds selected for future research to determine numbers and types of species of benthic macroinvertebrates present.

2. Qualitative survey of the periphyton in streams in selected watersheds.

3. Updated survey of fish in streams in selected watersheds.

4. Development of a map showing locations of wetlands, ponds, bogs, and other non-lotic aquatic habitats in the park.

5. Aquatic and semiaquatic herpetofauna (salamanders, frogs, lizards, snakes, turtles) surveys to determine current status of rare and/or endemic species (red-cheeked salamanders, bog turtles, hellbenders, etc.).

Watershed - Stream Relationships

6. Effects of the various dominant vegetation types found in the park on lotic communities via differences in quantity and quality of input of allochthonous detritus.

*7. Effects on the various vegetation/soil/bedrock geology combinations found in the park on stream baseflow and stormflow chemistry.

8. Effects of storm-event related streambed scouring on benthic communities.

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*Indicates that studies in these areas are under way.

9. Effects of catastrophic floods on fish and aquatic salamander communities.

10. Consequences of large organic debris loading in streams in virgin watersheds; use of large woody debris and debris dams as habitat by benthic macroinvertebrates.

Other Basic Ecological and Organismal Studies

11. Community structure and dynamics in all streams in selected watersheds, but especially in habitats that have not been studied in other places in the southern Appalachians, to include:

    a. Periphyton

    *b. Macroinvertebrates

    c. Salamanders

    d. Fish

) Individually and as a whole stream community

12. Low-flow effects on stream communities during droughts.

*13. Trophic relationships within macroinvertebrate communities.

14. Trophic relationships within whole stream communities.

15. Competition between all native fishes and introduced brown trout and rainbow trout.

16. Life history studies of benthic macroinvertebrates.

17. Studies of genetic diversity in aquatic organisms, including:

    a. Descriptions of any undescribed species of macroinvertebrates in the park.

    b. Description of undescribed species of periphyton in the park.

    c. Continued taxonomic studies of salamanders in the park.

    d. Continued taxonomic studies of fish in the park.

18. Life histories and population dynamics of nonsalmonid game fish species and nongame fish species.

Pollutant Loading and Disturbance Ecology

19. Impact of toxic trace element loading in streams at both baseflow and storm event stages.

20. Effects of increased hydrogen ion loading during storm events in streams along longitudinal/altitudinal gradients.

21. Aluminum chemistry and related effects in streams.

22. Increases in pollutant loading attributable to unusual circumstances such as cloud moisture scavenging at high elevation or due to peculiarities found in certain vegetation/soil/bedrock types.

23. Stream recovery rates from impact of Anakeesta roadfill.

24. Effects of increased loading of organic leachate associated with atmospheric deposition on periphyton communities and consequent effects on aquatic food chains.

25. Impacts on biotic communities from historical preservation practices in Cades Cove.

*26. Use of benthic macroinvertebrates as biological indicators of pollution, including stream acidification and toxic trace elements.

*27. Accumulation of toxic trace elements in the tissues of aquatic organisms.

28. European wild hog effects on wetland areas and headwater streams.

29. Effects of devastation of fir trees by balsam woolly aphids on headwater streams.

30. Visitor impacts on stream ecosystems.

Stream Monitoring

31. Development of a comprehensive stream monitoring program.

32. Development of suitable methods for regularly sampling stream organisms.

Habitat Preservation and Protection of Rare and Endangered Species

33. Development of habitat preservation plan for bog turtles, if and when populations are found in the park.

34. Development of a plan to protect and preserve hellbender populations in larger streams and rivers.

35. Development of a plan to remove introduced grey-cheeked salamanders from the park if research on interspecific competition indicates that they are a threat to native red-cheeks.

*36. Development and implementation of a plan to protect and preserve native brook trout populations and their habitat.

III.B. Terrestrial Ecosystems

Terrestrial Flora

Vegetation-Landscape Relations

1. Heath balds: origin, soil evidence, relation to bedrock, and stability.

*2. Vegetation models: predicting vegetation types from topographic variables using remote sensing data and cartographic data set.

*3. Succession and land use history: old homesites, old pastures, garden plots, hayfields.

4. Revegetation of lower parts of debris avalanches.

5. Grape infestation patches: relationship to disturbance, and effect on succession.

6. Resampling of Miller plots.

7. Resampling of Oosting and Billings spruce-fir plots.

*8. Forest modeling: adapting the FORET growth simulation.

9. Vernal flowering displays: prediction from environmental conditions, effects of disturbance history (logging, farming) and wild hogs; marking of phenology plots

10. Rhododendron:prediction of occurrence, resolution of the disequilibrium problem, effects on tree regeneration.

*11. Grassy balds; monitoring the effects of management.

*12. Natural dynamics of the spruce-fir system (old-aged gap dynamics).

13. Dynamics of the remanant virgin forests: Are the big tree stands breaking up?

Fires, Fuels, and Woody Debris

14. Inputs: landscape model of production.

15. Decay rates.

16. Debris fall: size/frequency analysis of organic matter fall.

17. Interface with aquatic systems: debris dams and litter inputs

*18. Fuel models: typing and recognition in GRSM.

19. Logs as seed beds: their importance in tree regeneration as a function of vegetation type and site

*20. Synergism between disturbances; heavy fuel loadings after balsam woolly aphid, pine beetle, and windstorm, and the potential for catastrophic fires.

Disturbance Ecology

*21. Quantification of natural and human disturbance gradients, frequency, intensity, and magnitude as a function of landscape parameters.

22. The riparian zone: flood scour and flood regime, and interactions with recreational impacts

Exotics

*23. Gypsy moth: monitoring for the insects, collection of baseline data on ecosystem structure and function in susceptible stands.

24. *Microstegium*: survey of an exotic grass in its invasion phase.

25. Honeysuckle: updated survey for the park and trial of management.

26. Exotic plants at old homesites, inholdings, and analysis of possible future problems.

*27. Overall exotic plant management plan.

28. Native vegetation on kudzu sites: nitrogen fertilization and site rehabilitation.

Rare Plants

29. Species biology and population dynamics: *Adlumia fungosa*, *Synandra hispidula* (both biennials with widely fluctuating population levels); *Phacelia* spp. (winter annuals).

30. Population biology of the three GRSM endemics: *Cacalia rugelia*, *Calamagrostis cainii*, *Glyceria nubigena*.

31. *Panax quinquefolius*: habitat analysis, population sizes, permanent plot monitoring.

32. Plants and poaching: the energetics and allocation-impact of plant gathering, including whole plant and above-ground picking.

33. Introgressive hybridization in rare species: Gregory Bald azaleas and Roan rattlesnake root.

Other

*34. Upgrading the hardmast survey and monitoring; evaluation of the significance of acorn consumption by wildlife, including wild hogs, in terms of oak tree seedling establishment.

35. Upgrading the campsite monitoring program--summary and reassessment of the program.

36. Biological survey of the Cities Service property.

37. Wetlands management plan for GRSM: establishing baseline data on biotic communities, food regime, and succession.

38. Chestnut blight recovery project.

*39. Expanding the life history data for vascular plants: hog food items, pollutant sensitive genera.

40. Role in forest dynamics: *Aesculus octandra*, *Robinia pseudo-acacia*

41. Wildlife habitat: modeling the occurrence of denning trees for black bear.

42. The trailside phenomenon: increased biomass, flowering, and invasion by certain herbs.

43. Dynamics of the Houston Chambers Pond flora.

44. The slowness of succession on the White Oak Sink valley floor.

*45. Survey of the Foothills Parkway management corridor for a natural resources plan.

46. Fate of chestnut logs and reconstruction of the silvics of chestnut.

47. The E-W floristic gradient quantified--presence/absence, hemlock distribution.

Terrestrial Fauna

48. Catalog rare animal species present in the park.

49. Develop a means to monitor deer browse, Cades Cove.

50. Survey small mammals in the park.

51. Develop means to monitor changes in species composition and population levels of mammals and birds in the spruce-fir forest in response to the loss of fir trees.

52. Assess level of recruitment of skunks into campgrounds.

53. Determine whether skunks frequenting campgrounds have higher reproductive rates than non-campground skunks.

54. Develop a means to monitor distribution and movement patterns of coyotes and their effects upon prey species.

55. Develop a computer model to simulate the competitive interaction between European wild hogs and native wildlife species.

56. Determine what effects European wild hogs may have on other game species.

57. Utilize small mammal road kills to monitor general health of these animals as well as major changes in population levels and movement patterns.

58. Develop a means to monitor the effects of human visitation to caves on habitat condition and hibernation of bats.

59. Develop a means to monitor density, distribution, and effects of beavers as they reestablish in the park.

60. Study of competition between introduced grey-cheeked and native red-cheeked salamanders.

III.C. Sociological Studies

1. Evaluate how effectively interpretive programs convey management issues to the public.

*2. Describe behavior patterns in frontcountry and backcountry campsites.

3. Evaluate potential for conflict between hikers and horses.

*4. Evaluate potential for conflict between bikers and automobiles in Cades Cove.

5. Evaluate potential for conflict between tubers and fishermen on streams.

6. Develop interpretive programming for management issues such as air quality, hog control, biosphere reserve management.

7. Evaluate visitor flow patterns.

8. Evaluate the interpretive potential of commercial bus tours.

9. Investigate the extent of the use of drugs in the park.

10. Evaluate impact of tourism development surrounding the park on the local scenic landscape and culture.

11. Further study of human/bear interaction in the back- and front country.

12. Describe social behavior patterns at primary points of interest Newfound Gap, Clingmans Dome, Mount LeConte.

*13. Use of touch screen computers in visitor center.

14. Social behavior at shelters along the Appalachian Trail.

March 3, 1849

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environment and cultural value of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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